

Beyond Natural and Economic Impacts: A Model for Social Impact Assessment of Brownfields Development Programs and a Case Study of Northeast Wilmington, Delaware

A report produced for the Delaware Department of Natural Resources and Environmental Control by the University of Delaware's Center for Community Research and Service, School of Public Policy and Administration

Sharon Merriman-Nai, Principal Investigator
Dionna Sargent, Graduate Research Assistant

February 2013



Acknowledgements

Center for Community Research and Service

Formally founded in 1972 as the Urban Agent Program, the Center for Community Research and Service (CCRS) in the School of Public Policy and Administration is the University of Delaware's focal point for community engagement and action. The mission of CCRS is to provide usable knowledge, education, training, and services that increase the ability of government, nonprofit agencies, philanthropic organizations, and citizens to enhance the quality of their communities. Dr. Steven W. Peuquet serves as the Center Director.

Delaware Brownfields Development Program

The Delaware Brownfields Development Program (BDP) is part of the Site Investigation and Restoration Section of the State's Department of Natural Resources and Environmental Control (DNREC) Division of Waste and Hazardous Substances. Signed into law in 2004, the program encourages the cleanup and redevelopment of vacant, abandoned, or underutilized properties that may be contaminated. To date, DNREC has certified over 100 sites as brownfields and has successfully remediated many of these. James M. Poling serves as the Program Administrator.

The research team would like to acknowledge the assistance of the following entities in obtaining data for use in this report: Criminal Justice Council, Statistical Analysis Center, State of Delaware; Department of Public Health, Health Statistics Center, State of Delaware; Licenses & Inspection Department, City of Wilmington. We would also like to thank Mr. Poling and all of the BDP affiliates who provided technical information on individual brownfield development projects as well as the program itself. We are particularly grateful to the key informants who generously shared their time and insights regarding brownfield regeneration and Northeast Wilmington. Lastly, James Poling of BDP and Steven Peuquet and Raheemah Jabbar-Bey of CCRS provided very helpful advice and guidance throughout the course of the project.

Table of Contents

Acknowledgements	2
Table of Figures	5
Executive Summary	7
Introduction and Purpose of the Study.....	7
The Convergence of Brownfield Development, Environmental Justice, and Social Impact Assessment.....	8
Findings and Recommendations.....	8
Introduction and Purpose of the Study	11
Federal Land Revitalization and the Delaware Brownfields Development Program	13
Brownfield Development and the EPA.....	13
The Delaware Brownfields Development Program	14
The Convergence of Brownfield Development, Environmental Justice, and Social Impact Assessment.....	16
The Literature on Social Impacts Related to Brownfield Development	18
The Framework of Social Impact Assessment.....	18
Adapting the Model of Social Impact Assessment for Brownfields Development Programs	20
Methodology for a Pilot Assessment of Social Impacts of Brownfield Development in Northeast Wilmington.....	21
Secondary Data Sources	23
Primary Data Sources.....	23
Northeast Wilmington: An Environmental Justice Community.....	24
An Overview of the City of Wilmington, Delaware.....	24
Northeast Wilmington: The Test Kitchen for Social Impact Assessment of Brownfields Development Programs.....	25
Brownfields Development in Northeast Wilmington.....	28
State-Certified Brownfields in Census Tract 6.01	29
Speakman Townhomes	29
DelSteel Property	29
605 Vandever Avenue	30
Delta Outreach.....	30
Purina Tower A or Brandywine School District Transportation Property	30
State-Certified Brownfields in Census Tract 6.02	30
Wiley Cork Factory	30
38 Vandever Avenue.....	31
97 Vandever Avenue – Habitat for Humanity	32
Diamond State Salvage.....	32
901 East 17 th Street.....	32
Franklin Fibre Parking Site	33
Bell Funeral Home	33
State-Certified Brownfields in Census Tract 30.02 (formerly 7 & 8).....	33
Thatcher and North Heald Streets – Habitat for Humanity.....	33

1000 East 12th Street – Habitat for Humanity	33
Riverside Development/Kingswood Community Center	34
Naga Foods.....	34
12 th and Brandywine Streets.....	34
Former Diamond State Recycling.....	34
Findings – Changes in Social Indicators	34
Demographics	35
Population.....	35
Race.....	36
Level of Education	39
Income and Poverty.....	42
Neighborhood Economy	47
Housing	47
Employment.....	52
Health and Safety	54
Crime.....	54
Health Indicators.....	61
Licensing and Inspection	61
Information Provided by Key Informants and Through Additional Sources.....	62
Knowledge and Perceptions of BDP and Brownfield Development in Northeast Wilmington..	63
Changes in Northeast Wilmington Perceived to Be Related to Brownfield Development	65
Key Informant Perceptions of the Delaware Brownfields Development Program.....	69
Perceived Strengths of the Delaware Brownfields Development Program.....	69
Perceived Limitations of the Delaware Brownfields Development Program.....	70
Key Informant Recommendations for Program Improvement.....	70
Discussion	71
Limitations	75
Conclusions, Recommendations, and Implications	77
Question 1: What Methodology can Measure the Intangible Impacts Produced by the	
Brownfields Development Program (BDP) in Northeast Wilmington?	77
Question 2: Using SIA, What Appear to be the Primary Intangible or Social Impacts	
Produced by BDP Initiatives in Northeast Wilmington?	78
Question 3: What Recommendations Could Enhance the Delaware BDP to Minimize	
Negative and Maximize Positive Social Impacts?	79
Question 4: How can SIA be Adapted for use in Evaluation of Brownfield Development	
Programs Elsewhere?.....	82
Recommendations for Future Steps.....	83
References	85
Appendices	89
Appendix A: Social Impact Assessment (SIA) Model for Brownfields Development	
Programs and Initiatives.....	90
Appendix B: Social Impact Assessment (SIA) Framework for Measuring Changes among	
Social Indicators over Time	94
Appendix C: State-Certified Brownfield Properties in Northeast Wilmington, DE	104
Appendix D: Delaware Brownfield Development Program Process	107
Appendix E: Sample Key Informant Semi-Structured Interview Questionnaire	108

Table of Figures

Figure 1: Certified Brownfields in Northeast Wilmington – 2012.....	26
Figure 2: Former Speakman Factory.....	29
Figure 3: Speakman Place Townhomes.....	29
Figure 4: DelSteel Property – Before and After.....	30
Figure 5: Remains of the Former Wiley Cork Factory, and the Remediated Site.....	31
Figure 6: 38 Vandever Avenue - Before and After Remediation	31
Figure 7: 97 Vandever Avenue - Before Development and After Construction of New Habitat for Humanity Townhomes.....	32
Figure 8: Former Brownfield at Thatcher and Heald Streets and Same Site after Construction of New Habitat for Humanity Townhomes	33
Figure 9: Population Change by Sex in Census Tracts in Study Area, Aggregate Study Area, and the City of Wilmington between 2000 and 2010	35
Figure 10: Change in Race and Ethnicity in Census Tracts 6.01, 6.02, 30.02 between 2000 and 2010	37
Figure 11: Change in Race and Ethnicity in the Aggregate Study Area and Wilmington between 2000 and 2010.....	38
Figure 12: Percent Change in Residents with No Diploma (including residents without 9th grade education) in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010.....	40
Figure 13: Percent Change in Residents with a High School Diploma (including GRE) in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010.....	40
Figure 14: Percent Change in Residents with Some College (but No Degree) in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010	41
Figure 15: Percent Change in Residents with a Bachelor's Degree in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010	41
Figure 16: Percent Change in Residents with a Graduate or Professional Degree in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010.....	42
Figure 17: Household Income Levels for Aggregate Study Area in 2010 and 2000	43
Figure 18: Percent Change in Number of Households at Different Income Levels in Census Tracts, Aggregate Study Area and City of Wilmington between 2000 and 2010	43
Figure 19: Percent Change in Number of Households with Income Less than \$14,999 in Census Tracts, Aggregate Study Area and the City of Wilmington.....	44
Figure 20: Percent Change in Number of Households with Income between \$15,000 and \$34,999 in Census Tracts, Aggregate Study Area and the City of Wilmington	44
Figure 21: Percent Change in Number of Households with Income between \$35,000 and \$74,999 in Census Tracts, Aggregate Study Area and the City of Wilmington	45
Figure 22: Percent Change in Number of Households with Income between \$75,000 and \$149,999 in Census Tracts, Aggregate Study Area and the City of Wilmington	45
Figure 23: Percent Change in Number of Households with Income of \$150,000 or more in Census Tracts, Aggregate Study Area and the City of Wilmington.....	46

Figure 24: Percent Change in Number of Residents Living Below the Poverty Line in Census Tracts, Aggregate Study Area and the City of Wilmington.....	46
Figure 25: Housing Units and Tenure in Census Tracts, Aggregate Study Area and City of Wilmington in 2000 and 2010	48
Figure 26: Percent Change in Housing Tenure in Census Tracts, Aggregate Study Area and City of Wilmington in 2000 and 2010.....	49
Figure 27: Percent Change in Housing Values in Aggregate Study Area and City of Wilmington between 2000 and 2010.....	50
Figure 28: Change in Number of Housing Units with Value of \$99,000 or Less in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010.....	50
Figure 29: Change in Number of Housing Units with Value of \$100,000 to \$199,999 in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000-2010.....	51
Figure 30: Change in Number of Housing Units with Value of \$200,000 to \$499,999 in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010	51
Figure 31: Change in Number of Housing Units with Value of \$500,000 or more in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010.....	52
Figure 32: Percent Change in Labor Force in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010	53
Figure 33: Percent Change in Employed and Unemployed Persons in Civilian Labor Force in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010	54
Figure 34: Comparison of Violent Crime Complaints in Aggregate Study Area and the City of Wilmington from 2003 to 2010.....	55
Figure 35: Comparison of Violent Crime Arrests in Aggregate Study Area and the City of Wilmington from 2003 to 2010	56
Figure 36: Violent Crime Complaints & Arrests in Census Tract 6.01 from 2000 to 2010 ...	56
Figure 37: Violent Crime Complaints & Arrests in Census Tract 6.02 from 2000 to 2010 ...	57
Figure 38: Violent Crime Complaints & Arrests in Census Tract 30.02 from 2000 to 2010.....	57
Figure 39: Drug Crime Complaints in Aggregate Study Area and the City of Wilmington from 2003 to 2010	58
Figure 40: Drug Crime Arrests in Aggregate Study Area and the City of Wilmington from 2003 to 2010	59
Figure 41: Drug Crime Complaints & Arrests in Census Tract 6.01 from 2000 to 2010.....	59
Figure 42: Drug Crime Complaints & Arrests in Census Tract 6.02 from 2000 to 2010.....	60
Figure 43: Drug Crime Complaints & Arrests in Census Tract 30.02 from 2000 to 2010	60
Figure 44: Health Indicators - Low Birth Weight, Infant Mortality, Congenital Anomalies, Cancer Deaths.....	61
Figure 45: Licensing and Inspection Complaints in Aggregate Study Area and the City of Wilmington from 2007 to 2011	62

Executive Summary

Introduction and Purpose of the Study

According to the Environmental Protection Agency (EPA, 2012), there are at least 450,000 brownfields in the US, suggesting that brownfields are a potential land use resource of considerable magnitude. Brownfields are frequently found in communities with higher rates of poverty and unemployment, where neighboring residents are disproportionately impacted by economic, social, environmental, health, and energy disparities. These neighborhoods are often referred to as environmental justice communities.

The EPA provides states with funding to promote and incentivize the assessment, cleanup or containment of risk, and sustainable reuse of these sites, particularly as a means to promote environmental justice.

The potential for brownfield development to generate positive economic growth has prompted extensive studies measuring the economic impacts of brownfield development. By comparison, there has been very little analysis of the *social* impact of brownfield development on a community. Such an evaluation would consider whether the overall well-being of community members had changed as a direct or indirect result of the remediation and reuse of these formerly obsolete and contaminated properties.

This report describes the background theory and the adaptation of a social impact assessment model for brownfield development, and the preliminary piloting of selected aspects of the model in Northeast Wilmington, an urban environmental justice community in New Castle County, Delaware (comprised of Census Tracts 6.01, 6.02, and 30.02).

Because it is an environmental justice community with a high degree of brownfield regeneration, Northeast Wilmington is an ideal setting in which to pilot test select elements of brownfield program evaluation. Brownfield development in this area ranges from very small properties that have been or will be incorporated into small private businesses, to larger lots intended for community services and activities, to major housing developments. Some projects, like Speakman Place, are “up and running,” while others brownfields are still in the environmental investigation and remediation phases.

In this study, we address the following questions:

- What methodology can adequately measure the intangible impacts produced by the Delaware Brownfields Development Program (BDP) in Northeast Wilmington?
- Using this methodology, what appear to be the primary intangible impacts produced by the Delaware BDP initiatives in Northeast Wilmington?
- Based upon the results of the pilot study in Northeast Wilmington, how could the Delaware BDP be enhanced to minimize negative and maximize positive intangible

impacts?

- How can the methodology be adapted and used to measure the intangible impacts of brownfield development programs in other communities?

The Convergence of Brownfield Development, Environmental Justice, and Social Impact Assessment

Environmental justice and the need to evaluate cumulative intended and unintended spillover effects of brownfield development intersect in the theoretical framework of Social Impact Assessment (SIA). This approach requires anticipation of the consequences of proposed development across a comprehensive range of domains with particular attention to their impact on the most vulnerable stakeholders.

Although SIA is prospective in theory, we adapted the model to retrospectively establish baseline measures of social variables. One of the goals of the current study was to explore the association between brownfield regeneration that had taken place since the inception of the Delaware BDP and changes within the community. This required measuring changes in select social indicators over time across the following domains: demographics; civic engagement/empowerment and community pride; neighborhood economy; health and safety; cultural/aesthetics; and perceptions and awareness of community members. Quantitative data was obtained from sources such as the U.S. Census (and its annual American Community Survey) and local public records (crime, health, licensing and inspection, etc.).

However, a hallmark of SIA is the use of qualitative data from primary sources, which is especially beneficial when the association may be indirect, a likely scenario when considering the impact of brownfield regeneration. As part of this study, key informants were interviewed regarding their knowledge and experience with the Delaware BDP and brownfield regeneration in Northeast Wilmington. Participants also provided a wealth of information on other factors they believed were associated with changes in the community, or that limited the social impact of brownfield regeneration.

SIA is a strategy for promoting continuing participation of all stakeholders to monitor the impacts of proposed interventions and also to provide recommendations for program improvement and policy development. It is important to bear in mind that this was a pilot study designed to explore the feasibility of the assessment approach while simultaneously exploring the program's impact. Although this initial SIA of the Delaware BDP in Northeast Wilmington was limited in scope and retrospective in design, the foundation for ongoing, prospective assessment is now in place. (The SIA framework and guidelines for replicating the model are including in the Appendices.)

Findings and Recommendations

The trends observed in the pilot study suggest that the BDP activity in Northeast

Wilmington has contributed to neighborhood stabilization and revitalization. Specifically, areas with the greatest degree of completed brownfield regeneration, particularly development of safe and affordable housing, appeared to experience the most positive trends in the following domains: neighborhood economy (indicated by changes in income levels, housing values and tenure, employment, educational attainment, and the attraction of private development and new businesses); civic pride and community engagement (characterized by increased participation in community events, increased reporting of suspected criminal activity, etc.); aesthetics (improved maintenance of property, perceived decline in the rate of illegal dumping); enhanced community infrastructure and services (additional community-based educational services, a new health clinic, more faith-based initiatives); health and safety (increases in crime reports and decreases in arrests, and the availability of fresh and affordable produce through urban gardening efforts); and enhanced community leadership by nonprofit organizations engaged in brownfield development (*e.g.*, New Destiny Fellowship community development corporation, Habitat for Humanities, etc.).

However, negative indicators were also observed, including: income disparities; some declines in income levels, specific levels of educational attainment, and employment rates within individual census tracts; and increases among certain public health markers.

Overall, key informants repeatedly reported that positive changes were occurring throughout Northeast Wilmington. The most significant change in Northeast Wilmington that all participants had observed was the increase in safe and affordable housing. Increased home ownership, and a decline in absentee landlord-owned rental properties, was considered the key to community stabilization and revitalization. They associated these changes, at least to some degree, directly or indirectly with brownfield regeneration. There was also a sense that the rehabilitation of contaminated properties and the influx of new residents due to housing opportunities had the spillover effect of attracting new investment in the area. However, they also reiterated that these changes were occurring slowly and perceived that broad economic factors limited the progress of brownfield development; therefore, more time would be needed to fully assess the program's benefits. In addition, they recommended more in-depth analysis, including attitudinal community-based surveys regarding brownfield development.

The Delaware BDP was perceived to be a very effective and efficient program. Project managers and the program administrator were considered extremely knowledgeable, flexible, "pro-development," responsive and sensitive to the needs of developers, particularly nonprofit developers operating with limited resources, and to the needs of community members when they were expressed. It is telling that all key informants who were brownfield developers reported they would work with the Delaware BDP when and if opportunities and needs were to arise in the future.

The most common criticism of the program was that the BDP is not visible enough, and therefore is underutilized, which lessens its overall potential impact as a conduit for community engagement and renewal. Further, the BDP is *responsive* to initiatives that are generated based upon the individual goals of individual developers. While the vast majority

of brownfield activity in Northeast Wilmington has been conducted through nonprofit organizations investing in community revitalization, these efforts have been piecemeal; regeneration has not resulted as part of a holistic, transformative strategy for community revitalization led by the BDP.

The EPA originally envisioned brownfield regeneration as a transformative catalyst through which genuine environmental justice could be achieved. Findings from the Northeast Wilmington case study indicate that the BDP, directly and indirectly, has had a positive social impact upon a community that continues to face serious challenges. However, this impact appears limited, in part, due to the responsive nature of the program. The BDP appears to have the potential to heighten its social impact considerably if it takes on a more proactive leadership position in community development in full partnership with all other planning strategists.

We offer a number of recommendations to enhance the Delaware BDP's role as a leader in partnership with community members and organizations, government entities, and other stakeholders in establishing and implementing holistic and coordinated planning efforts that incorporate brownfield regeneration. Such recommendations include the appointment of a statewide BDP coordinator to work in conjunction with the designated public information officer in promoting the program and informing the public of the benefits and opportunities it provides.

The methodology tested in this study is adaptable for use by other brownfields programs. It would be ideal if such programs established, from baseline, evaluation strategies to measure social variables over time. We recommend that future assessments be conducted periodically to inform planning and development strategies, program improvement, and to foster the ongoing involvement of stakeholders, particularly community members. If SIA is conducted routinely, a brownfields program has the potential to become increasingly prospective in terms of self-evaluation of its social impacts, and would therefore be in a position to take on a more proactive and transformative role in promoting community revitalization. This would also allow for continuing participation of all stakeholders, especially the most vulnerable – in this case, members of environmental justice communities.

The results of this study indicate that brownfield regeneration not only serves to reduce environmental risk and produce economic benefits, but also holds the potential to enhance the social well-being of residents in environmental justice communities. The difficulty in clearly ascribing social impacts solely to brownfield regeneration has been acknowledged throughout this report. But it appears more prudent to instead consider how SIA can be employed by brownfields development programs to transition to more proactive and transformative roles in leading efforts to achieve genuine environmental and social equity. This study will hopefully stimulate greater interest in measuring the social impacts of brownfield regeneration, and understanding the value of brownfields development programs as catalysts for environmental justice.

Introduction and Purpose of the Study

Since the 1990s, the United States Environmental Protection Agency (EPA) has made funding available to encourage states to address the problem of brownfields. EPA defines a brownfield as “a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant” (EPA, “[Brownfields and Land Revitalization, Basic Information](#),” 2012). Although these properties (*e.g.*, former industrial sites, dry cleaners, salvage operations, and leather tanning shops) do not pose the same degree of environmental hazard as a Superfund site, they do require environmental evaluation and remediation to eliminate or manage their inherent risks before they can be safely redeveloped.

According to the EPA (2012), there are at least 450,000 brownfields in the US, suggesting that brownfields are a potential land use resource of considerable magnitude. Brownfields are frequently found in communities with higher rates of poverty and unemployment, where neighboring residents are disproportionately impacted by economic, social, environmental, health, and energy disparities. These neighborhoods are often referred to as environmental justice communities.

Efforts to clean up and contain these environmental risks – to allow nearby residents to have access to a healthy atmosphere – resonate, then, on several levels. Not only does this cleanup improve the environment; brownfield development can be a catalyst for reviving a community and stimulating its economic growth. The EPA provides states with funding to promote and incentivize the assessment, cleanup or containment of risk, and sustainable reuse of these sites, particularly as a means to promote environmental justice.

The EPA defines environmental justice as:

the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work. (EPA, “[Environmental Justice Basic Information](#),” 2012)

Converting vacant and contaminated parcels of land into housing, community centers, or businesses increases the local tax base and is likely to raise local housing values. It may attract and encourage other developers to invest in a particular area and increase commerce. This potential for positive growth has prompted extensive studies measuring the economic impacts of brownfield development.

By comparison, there has been very little analysis of the *social* impact of brownfield development on a community. Such an evaluation would consider whether the overall well-being of community members had changed as a direct or indirect result of the remediation and reuse of these formerly obsolete and contaminated properties. The analysis might consider the following types of questions:

- Is there evidence that community pride and engagement has changed in response to brownfield development?
- Is housing safer and more affordable?
- Do residents have greater access to reasonably priced essentials, such as fresh produce?
- Has the rate of crime changed?
- Are people more likely to take a walk or ride a bike because of changes in the streetscape?
- Are there more vocational opportunities in the area?

While it seems intuitive that managing an environmental risk and productively reusing a formerly abandoned property would benefit a community from a social standpoint, this hypothesis has not been sufficiently tested. While one may assume that brownfield development might lead to positive social changes for community members, in fact, negative consequences, such as displacement or gentrification, may occur. Evidence-based approaches increasingly inform policy development and resource allocation, but in the case of brownfield development there is insufficient evidence regarding its potential and realized value in terms of social benefits for community members. Therefore, the conceptualization and implementation of a process to document and measure such outcomes, although challenging, is important and worthwhile.

This report describes the background theory and the adaptation of a social impact assessment model for brownfield development, and the preliminary piloting of selected aspects of the model in Northeast Wilmington, an urban environmental justice community in New Castle County, Delaware. Specifically, we address the following research questions:

- What methodology can adequately measure the intangible impacts produced by the Delaware Brownfields Development Program (BDP) in Northeast Wilmington?
- Using this methodology, what appear to be the primary intangible impacts produced by the Delaware BDP initiatives in Northeast Wilmington?
- Based upon the results of the pilot test in Northeast Wilmington, how could the Delaware BDP be enhanced to minimize negative and maximize positive intangible

impacts?

- How can the methodology be adapted and used to measure the intangible impacts of brownfield development programs in other communities?

The lessons learned from this pilot will hopefully stimulate a broader interest in measuring the overall impacts of brownfield development – an interest that reaches beyond economic and environmental dimensions – and encourage brownfields development programs to take on a greater role in establishing true environmental equity as a staple of community revitalization.

Federal Land Revitalization and the Delaware Brownfields Development Program

Brownfield Development and the EPA

Regenerating brownfields became an important strategy as the EPA sought ways to restore compromised infrastructure and alleviate development pressures on greenspaces that accompanied urban sprawl (EPA, 2010). Historically, federal brownfields policy development and the drive to promote social and environmental equity have been intertwined:

The Brownfields Program and the environmental justice movement have evolved over a similar timeline, fueling one another and helping to build strong communities. (EPA, [“Addressing Environmental Justice in EPA Brownfields Communities,”](#) 2009, p1)

In order to protect the environment, strengthen the marketplace, and foster the necessary collaborations to revitalize distressed communities, the EPA established the federal Brownfields Program in 1995:

to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields.... (EPA, [“Addressing Environmental Justice in EPA Brownfields Communities,”](#) 2009, p1)

In 2002, the federal [Small Business Liability Relief and Brownfields Revitalization Act](#), known as “the Brownfields Law,” was enacted. The law amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund Act) by expanding EPA assistance and encouraging private and public sector involvement through the availability of brownfields assessment grants, cleanup grants, revolving-loan fund grants, and brownfields job training grants. Nonprofit organizations, frequently engaged in community revitalization, became eligible for funding. The law specifically included

requirements to address environmental justice. It also clarified and extended liability protection for those who opt to develop brownfields under the program (EPA, 2009).

The Delaware Brownfields Development Program

In 2004, the Delaware Brownfields Development Program (BDP) was established within the Site Investigation and Restoration Section (SIRS)¹ of the Division of Waste and Hazardous Substances, Department of Natural Resources and Environmental Control ([Delaware Code Title 7 Chapter 91 subchapter II](#)). As of May 2012, 166 brownfields have been certified in Delaware (DNREC, 2012). Although many of these are urban, formerly industrial sites, suburban and rural properties have also been certified as brownfields. The vast majority of these properties are located in the state's northernmost county, New Castle County.²

The BDP supports the remediation and redevelopment of properties that are vacant, abandoned, or underutilized by providing financial assistance and liability protections to eligible applicants. Several years ago, the [Delaware Brownfield Marketplace](#) was created to provide online access to information on market-ready brownfields. However, the BDP is not available to current site owners wishing to redevelop; current owners may participate in the Voluntary Cleanup Program.³

The cost of investigation and remediation is a major barrier to brownfield development; the BDP attempts to ameliorate these financial hurdles by providing these grants and loans. However, the liability protection from past releases of a hazardous substance is equally important in incentivizing the reuse of contaminated properties. As long as a developer follows through with the BDP-approved remediation plan and any future covenants to ensure the integrity of the property, and does not create a new source of contamination, he or she will not be held liable for the prior contamination. The significance of this protection cannot be overestimated.

¹ SIRS manages the Voluntary Cleanup Program (VCP), the Brownfield Development Program (BDP), and the enforcement provisions of the Hazardous Substance Cleanup Act (HSCA).

² For a listing, visit: [Certified Brownfields Sites in Delaware](#).

³ BDP funds are awarded to applicants on a first-come, first-served basis for eligible investigation and remediation expenses. In recent years, the BDP has been budgeted annually to allocate a total of up to \$1 million dollars in Delaware Economic Development Office (DEDO) funds and \$5 million in Hazardous Substance Cleanup Act (HSCA) funds. Nonprofit and public developers are capped at \$625,000 per site, with the first \$500,000 being matched dollar for dollar and the remainder being matched at \$0.50 per dollar spent. Private developers are capped at \$200,000 per site, with the first \$125,000 being matched dollar for dollar and the remainder being matched at \$0.50 per dollar spent. No more than \$1 million dollars may be granted to any developer in one fiscal year. According to the Delaware Department of Natural Resources and Environmental Control (DNREC), when the economy was strong these funds were exhausted before the end of the fiscal year, but this has not been the case since the economic downturn began in 2008. (BDP, 2012)

The detailed life cycle of a state-certified brownfield project, from application to completed redevelopment, is complex and involves many technical and legal steps. This process is highlighted in detail in Appendix D, but the following is a simplified summary of that process:

1. An interested developer inquires about a property and submits to SIRS a Brownfield Application, which includes information regarding the intended purpose of the development, the status of the prospective developer, and the reason for suspecting contamination.
2. The BDP administrator determines whether there is sufficient reason to certify the property as a brownfield and notifies the developer of the decision; if it is deemed eligible, the administrator also notifies the developer of funding eligibility.
3. A BDP project manager is assigned and a legal notice, stating that negotiations are underway for a Brownfield Development Agreement (BDA) is published in the local newspaper for a 20-day comment period.
4. A scoping meeting is held to determine the sampling methods and data collection needed to complete investigation of potential contamination.
5. A Brownfield Investigation (BFI) is conducted and those findings are reported to DNREC along with suggested remedial objectives.
6. A Proposed Plan of Remedial Action is drafted and published in the local newspaper for public comment; a public hearing may also be scheduled if requested.
7. The Final Plan of Remedial Action is implemented.
8. Remediation focuses on *management of risk of contamination*, not typically *removal of all contamination*. For example, contaminated soil may be removed to a certain depth and replaced with clean soil, as opposed to removing *all* contaminated soil. In other cases, vapor barriers may be installed or land may be capped with an impervious surface, such as concrete. The degree of remediation necessary depends upon the purpose of intended development; if the land is intended for residential use, remediation will be required to meet a higher standard than land intended for commercial purposes.⁴
9. Once the remediation is completed, all necessary covenants are created to ensure that future owners and occupants are aware of any restrictions necessary to maintain the integrity of the land. For example, residents may be made aware of prohibitions from building in-ground swimming pools, as this would involve digging deeper than the new layer of uncontaminated soil. Similarly, operations and maintenance plans are approved and stipulate maintenance requirements, such as annual inspection of an impervious cap.

The benefits of the BDP to Delaware's economy have been significant. According to an economic impact study conducted by the University of Delaware Center for Applied Demography & Survey Research (UD CADSR), every dollar spent by the BDP generates a \$17.50 return on the state's initial investment. Statewide, nearly 700 jobs were created as a result of ensuing remediation and development. Through 2008, the total assessed value of

⁴ These standards are based on identified contaminants and formulas established with regard to the average length of time individuals spend in particular settings.

state-certified brownfields in New Castle County increased by more than \$455 million (UD CADSR, 2010). Much of this success has been attributed to the cultivation of the Wilmington Riverfront on the city's south side, including Frawley Stadium, home of the Blue Rocks minor league baseball team, as well as restaurants and other commercial enterprises.

The community of Northeast Wilmington, however, has also been undergoing a tremendous amount of brownfield regeneration. Unlike the predominantly commercial activity on the south side, brownfield development in Northeast consists primarily of affordable housing projects and nonprofit investment. This region provides an ideal setting to pilot test an investigation of the social impacts of brownfield development in an environmental justice community. (A more detailed description of the area appears in the section entitled: *Northeast Wilmington: An Environmental Justice Community*.)

The Convergence of Brownfield Development, Environmental Justice, and Social Impact Assessment

Environmental justice communities are faced with environmental hazards but also with a lack of adequate affordable housing, healthy food choices, healthcare access, and business and employment opportunities. According to the EPA:

The environmental justice movement emerged in the 1980s when minority, low-income, and tribal communities began to organize in response to disproportionate environmental and health impacts in their neighborhoods such as hazardous facility siting, industrial contamination, air pollution, and lead poisoning. In 1982, residents of poor, predominantly African American Warren County, North Carolina protested the siting of a landfill, focusing national attention on this issue and sparking action in other communities. Subsequently, empirical studies have shown that environmental burdens are disproportionately located in minority, low-income, and tribal communities. (2012, p6)

In 1994, President Clinton signed the Environmental Justice Executive Order requiring all federal agencies to incorporate policies to address environmental inequities. The EPA has established the Office of Environmental Justice along with the [National Environmental Justice Advisory Council \(NEJAC\)](#), which “provides advice and recommendations about broad, cross-cutting issues related to environmental justice, from all stakeholders involved in the environmental justice dialogue....” (EPA, 2012)

Brownfield development programs can be mechanisms for addressing these issues; in fact, federal brownfields legislation enacted in 2002 *requires* that environmental justice be addressed through these programs (EPA, 2009). The regeneration of brownfields can also

be integrated into smart growth planning projects to facilitate environmental equity and sustainability (EPA, 2012).⁵

As noted in the introduction, brownfield development can be a catalyst for community revitalization by stimulating economic growth. However, while there have been substantial analyses of economic and environmental impacts of brownfields development and programs designed to promote and manage it, there is relatively little peer-reviewed literature on the evaluation of its social impacts. Social impacts, also known as spillover or intangible impacts, are defined by Burdge et al. as:

the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society. (2003, p231)

Some may assume that economic successes of brownfield development (or any development) may be yoked to social benefits for those most locally affected. But this is not a valid assumption. Gentrification, for instance, may result when property values increase following brownfield regeneration (National Environmental Justice Advisory Council [NEJAC], 2006; Pearsall, 2009; Essoka, 2010). According to Pearsall:

Although governments are careful to document the economic and environmental benefits of brownfield redevelopment, they do not always have resources to track the social impacts and broader implications of the redevelopment project on the local community. (2009, p117)

Tzoumis and Bennett (2009) also discuss the need for a social science perspective in evaluating brownfield development and the direct and indirect impacts associated with them. The authors state there is insufficient information that relates to social equity and environmental justice from a social science point of view. As such, the spillover effects of brownfield development in the adjacent communities are rarely considered.

⁵ It is important to note, however, that brownfields developers may choose areas that are more desirable (*e.g.*, near waterfront or business districts, areas reporting less crime and with higher property values, etc.) instead of areas where the need is most prevalent (*e.g.*, low income or minority neighborhoods). In an evaluation of New York State's brownfield development program, developers indicated areas that were thriving or had the potential to thrive economically were chosen as the location for cleanup and redevelopment. Home values, market conditions, skilled labor force, and crime rates were some of the determinants. The corollary to brownfields sites being selected based on economic drivers is that brownfields remain undeveloped in underserved communities, which perpetuates the communities' cycles of disenfranchisement.

The Literature on Social Impacts Related to Brownfield Development

An evaluation of spillover effects can provide insights regarding brownfields development programs as facilitators of environmental justice. A handful of peer-reviewed studies have touched upon individual social impacts related to brownfields development. In 2009, Perkins et al. investigated whether a new, middle-class housing project would spur a community-wide increase in homeowner pride and home improvements. Using observation, geographic information systems (GIS) mapping, public records of building permits, and resident surveys, researchers observed a small spillover impact in neighboring areas (2009). Nagengast and colleagues examined the relationship between land use and transportation linkages in residential areas where greenfields or brownfields were present. Empirical evidence indicated that brownfield development, particularly near a city center, reduced greenhouse gas emissions and pollution, demonstrating a positive externality with implications for health benefits (2011).

Environmental impact assessments and health impact assessments also evaluate respective predicted or realized consequences of brownfield regeneration. Wedding and Crawford-Brown developed a model for measuring site-level success focusing on sustainability and green building (2007). But efforts to measure an all-encompassing spectrum of spillover effects of brownfield development have not been fully integrated into a theoretical framework to globally assess the collective social impacts. Tzoumis and Bennett emphasize that this requires a multidisciplinary approach with significant involvement from the social sciences:

One professional often forgotten in these projects is the social scientist who understands the context and history of urban policy issues. This type of professional is able to synthesize information from different experts and apply it to the brownfield's community when considering the possible impacts of redevelopment. In particular, this professional can assist with the issues of social equity and environmental justice. (2009, p212)

However, in his study of unintended impacts of brownfield regeneration in New York, Pearsall employed a vulnerability framework and considered not only exposure but also sensitivity to stressors, along with adaptive capacity. Three-quarters of the study participants interviewed (n=55) perceived that post-regeneration exposure to stressors was either increasing or had capacity to increase due to environmental concerns, but also due to a rapid increase in the cost of living that they believed was a result of brownfield development (Pearsall, 2009). In his survey of brownfield pilot sites, Essoka (2010) also found that African Americans disproportionately experienced displacement as a result of brownfield development.

The Framework of Social Impact Assessment

Environmental justice and the need to evaluate cumulative intended and unintended spillover effects of brownfield development intersect in the theoretical framework of Social

Impact Assessment (SIA). This approach requires anticipation of the consequences of proposed development across a comprehensive range of domains with particular attention to their impact on the most vulnerable stakeholders. It is rooted in the impact assessment requirements of the US National Environmental Policy Act of 1969.⁶ As summarized by Burdge, a key proponent of SIA:

An impact assessment, whether social, economic or environmental, is a tool to help make decisions. Properly done, SIAs help the affected community or communities and the agencies plan for social change resulting from a proposed action or bring forward information leading to reasons not to carry out the proposal. (2003, p232)

In 1994, the Interorganizational Committee on Guidelines and Principles for Social Impact Assessment produced standards to assist federal agencies in implementing SIA. Because they were not widely used and were perceived to be “project-based” versus “policy-based” and too reflective of the US regulatory framework, national and international experts convened two new committees in 2003 to revise and expand the principles and guidelines. Two new documents were produced: *Social Impact Assessment International Principles and Principles and Guidelines for Social Impact in the USA*.⁷

Quoting from the US document:

As a decision tool, SIA provides information to agencies and communities about social and cultural factors that need to be considered in any decision; provides a mechanism for incorporating local knowledge and values into the decision; and can help a decision-maker identify the most socially beneficial course of action for local, regional, and national interests. (Burdge, 2003, p232)

The following principles support the US approach to SIA:

- *An extensive understanding of local and regional settings to be affected by the proposed action or policy*

⁶ For an overview of the evolution of social impact assessment (SIA), visit McKinsey and Company website: Urban World at: http://lsi.mckinsey.com/what_is_social_impact_assessment/the_history_of_social_impact_assessment

⁷ In his comparison of the two approaches, Vanclay (primary author of the international guidelines) highlights key differences between the philosophies and criticizes the revised US principles and guidelines as remaining focused on the project versus the policy level, thus being more reactive than proactive. He also believes the US version is more technocratic in tone. He suggests that the international principles and guidelines encourage more universal implementation of SIA by private sector companies and communities as a whole, with attention being given to ongoing processes and policies. Further, the US principles and guidelines employ a checklist of 32 SIA variables while the international version is based upon more than 80 concepts for consideration (Vanclay, 2003).

- *A focus on key elements of the human environment*
- *The identification and use of appropriate research methods and assumptions*
- *The collection of quality information for use in decision-making*
- *The assurance that any environmental justice issues are fully described, analyzed, and addressed.*
- *The implementation of a process for ongoing evaluation, monitoring, and mitigation of negative consequences.*

The US methodology includes a checklist of 32 suggested social indicators categorized broadly into the groups of population change, community and institutional structures, political and social resources, community and family changes, and community resources.

Rather than employ a checklist, the international guidelines present concepts for consideration that reflect a participatory and prospective approach:

The focus of concern of SIA is a proactive stance to development and better development outcomes, not just the identification or amelioration of negative or unintended outcomes.... (Vanclay, 2003, p2)

Both approaches consider the level of social utility of a proposed initiative and go beyond evaluating the potential change in the physical environmental conditions within a community to examine the potential changes in culture, perception, and behavior.

Adapting the Model of Social Impact Assessment for Brownfields Development Programs

We can borrow and modify elements of both the domestic and international philosophies of SIA to develop a theoretical framework for measuring spillover impacts of brownfields development programs. While there has not been extensive literature that examines the social impacts of brownfield development directly, what has been studied suggest linkages between brownfields development and spillovers. For example, the Nagengast (2011) study previously mentioned reported a reduction in greenhouse gases in areas near regenerated brownfields, which holds implications for improved health of nearby residents that, if realized, would likely generate other benefits. Nagengast examines one specific aspect of possible change; however, there are a multitude of social indicators relating to demographics, education, public health and safety, and civic engagement that could be examined to provide a more complete assessment of the social impacts of brownfield development on the community.

In addition, SIA incorporates both qualitative and quantitative research methods in social science investigations. The model combines the use of secondary data (collected from sources such as the Decennial Census, American Community Survey, state and local governments, and community resource centers) to quantify changes occurring in a study area over time. However, data from primary sources (such as key informant interviews, focus groups, and community member surveys) is vital in gaining perspectives on changes or prospective changes in the community, or to supplement or interpret the quantitative data. Additional sources, such as local newspapers or community newsletters, can also supplement or provide context for quantitative data.

But because SIA promotes a participatory approach that fosters collaboration among community stakeholders (*i.e.*, developers, planners, policymakers, community members) throughout the planning, development, monitoring, and evaluation phases, it is not only a viable strategy for measuring but also for optimizing social impacts. A study conducted by Gallagher and Jackson found that brownfield development has a greater impact in the community when community members are highly engaged in the decision-making process (2008). Researchers studying participatory processes have shown that involvement frameworks such as advisory committees and mediated negotiations build trust, educate, and produce decisions that are more acceptable to citizens (Beierle and Cayford, 2002). As noted by Greenberg and Lewis, this is particularly crucial in disadvantaged neighborhoods (2000).

The study of spillover effects is very dynamic in nature. Because it integrates local planning processes with environmental justice issues, SIA provides the quintessential framework through which to evaluate communitywide impacts of any type of development. However, in the initial application of SIA principles in evaluating impacts relevant to brownfield programs, researchers will most likely need to employ a retrospective analysis. Most agencies will not have created a baseline community profile of social indicators at the inception of their programs against which to compare progress. Therefore, it will be necessary to reconstruct baselines of social variables and gather perceptions “after the fact.” Once a baseline is established and initial evaluations are conducted, the foundation for ongoing, prospective assessment will be in place. The Methodology section highlights how elements of SIA were adapted in the current study.

Methodology for a Pilot Assessment of Social Impacts of Brownfield Development in Northeast Wilmington

There is great diversity among individual brownfield development projects undertaken to date in Northeast Wilmington. Not only do the initiatives vary significantly in terms

environmental issues, they also vary in terms of size and scale, proposed intended use (and the degree of remediation required), status of the developer (private, nonprofit, government, or partnerships), and the availability of resources to complete the project. Brownfield regeneration is ongoing; as older initiatives are completed (or, in some cases, are altered, abandoned, or simply idle), new projects begin.⁸

Additionally, brownfield activity does not take place in a vacuum but in real time in an interactive community amidst multiple sociological, economic, cultural, and other factors. Some influences that may impact brownfield development (as well as other conditions within the community) are local (for example, zoning issues) while others are more sweeping (such as state, national, or even international economic forces). These issues highlight the difficulty of measuring the social impact of brownfield activity within a region.

The greatest challenge to evaluating impacts of a program such as the BDP is in being able to show a causal relationship between the intervention (brownfield development) and the outcome, given that this does not occur in a vacuum but in the presence of many intervening influences. If positive changes are observed, for instance, a reduction in crime, can this be attributed to the development and reuse of former abandoned structures or is it the result of another community initiative, such as the Weed and Seed Program, or is it attributable to both efforts? On the other hand, if there is a negative change observed, such as a rise in unemployment rates, does this mean brownfield remediation has had a negative impact, or is this reflective of the broader economic backdrop?

Ideally, to isolate the confounding influences of other factors, researchers would have been able to conduct a comparative analysis between Northeast Wilmington and a community with a similar percentage of brownfields that was *not* experiencing a similar degree of brownfield regeneration. For a valid evaluation, the comparative community would also need to match Northeast Wilmington in profile (size, setting, population density and make-up, socio-economic status, geography, cultural influences, political system, etc.).

Because there was no such matching community available, despite the presence of multiple intervening variables, researchers selected a longitudinal model using a Time 1/Time 2 comparison of select social impact variables. Qualitative methods assisted researchers in interpreting quantitative data (such as US Census, crime reports, etc.) and teasing out some of the confounding influences. Although it would be impossible to completely isolate the impact of brownfield development on social variables in this or any community, the combined methodology allowed researchers to gain insights regarding the ways brownfield development were likely to have contributed to social changes. (These insights will also form the basis of future evaluation efforts, such as a population-based survey, to gather more detailed community member perceptions of the impact of brownfield development.)

⁸ Individual highlights are provided in the section entitled Brownfield Development in Northeast Wilmington and in Appendix C.

We adapted the SIA model to include a series of indicators sorted by the following domains: demographics; civic engagement/empowerment and community pride; neighborhood economy; health and safety; cultural/aesthetics; perceptions and awareness of community members; and physical environment.⁹ Data was then collected for comparison on select social indicators.

Secondary Data Sources

In piloting the SIA, researchers drew upon several secondary data sources to gather Time 1/Time 2 data on various select indicators: US Census and the American Community Survey were used for data on population and general demographics (including age, race, gender, education, employment, and income) and housing characteristics; health data was obtained from the Delaware Department of Health, Health Statistics Center; crime data was obtained from the Delaware Criminal Justice Council Statistical Analysis Center; and information related to neighborhood aesthetics was obtained by the City of Wilmington Department of Licensing and Inspection. Supplemental information regarding the study area was obtained from news articles and community outreach materials and other publications from the City of Wilmington.

Whenever possible, normative information was obtained for the City of Wilmington. Although researchers attempted to construct a consistent baseline (Time 1) using the year 2000, it was not always possible to obtain data that far back; in those instances the earliest data available was used. Baseline data was compared with information from the year 2010 unless otherwise noted. For most selected social variables, data was reported for the individual census tracts as well as for the aggregate study area in an effort to consider the potential association between the status and nature of proximal brownfield activity.

Primary Data Sources

In addition to secondary data sources, researchers developed a semi-structured interview protocol for use with key informants and submitted this to the University's Institutional Review Board for approval. Once the protocol was determined to be compliant with policies and regulations governing human subjects research, interviews were conducted with 18 stakeholders including: community advocates (such as leaders of civic associations, community development corporations, and nonprofit organizations); brownfield developers (some of whom were also community advocates); government officials; and others with in-depth knowledge of the community and the BDP. In this phase, we sought to obtain perceptions regarding observable social changes in the community and whether these changes were considered the result (to any degree) of brownfield development activity. Key informant interviews were also used to solicit feedback and recommendations

⁹ The SIA framework, including social indicators relevant to specific domains, is included in the Appendices. The resource limitations of this study allowed for comparison of only a subset of social impact indicators; in replication, future researchers may wish to expand the selection of variables measured.

for the BDP itself, and to mine for other potential strategies to measure its impact in Northeast Wilmington. Once key informant interviews were completed, themes identified were analyzed for commonalities and in comparison to secondary data collected.

Because it was equally important to understand the process and extent of brownfield development activity that had taken place to date, we also interviewed key BDP personnel. In addition to ongoing discussion with the BDP administrator and a physical tour of certified brownfields in the study area, we interviewed ten project managers responsible for each brownfield development in Northeast Wilmington, as well as the DNREC Environmental Program Administrator and Public Information Officer for the program.

Northeast Wilmington: An Environmental Justice Community

The bedrock of any SIA is an understanding of the characteristics of the study area, including its history and physical environment, socio-economic and demographic factors, commercial and other activities, and the resources available to the community as well as the challenges it experiences. The following is a concise profile of Northeast Wilmington, beginning with a brief overview of the City itself.

An Overview of the City of Wilmington, Delaware

Wilmington is located in New Castle County, the northernmost of Delaware's three counties. Accessible to Interstates 95 and 495, it lies midway between New York City and Washington, DC, and is approximately a half-hour drive from the Philadelphia International Airport. Amtrak railways and the Port of Wilmington, a deep water port and marine terminal located at the confluence of the Christina and Delaware Rivers, provide additional transportation access. This central location within the country's populous Northeast Corridor and easy access to multiple transportation networks contributed to Wilmington's earlier development as an industrial center.

The City, which was granted a charter in 1832, became a hub of industrial activity during the Civil War, known for producing military products such as iron ships, gunpowder, railroad cars, tents, and other military supplies. Industrial development was further stimulated by war efforts through the mid-20th century with the development and operations of shipyards, foundries, and chemical plants. Automobiles, leather products, and clothing were also manufactured. In the second half of the 20th century, large-scale manufacturing in the city declined, and recently, due to the state's appealing tax structure, Wilmington evolved as a corporate magnet where many high profile financial institutions and nearly half of all Fortune 500 companies are based (City of Wilmington Delaware, 2012).

In recent decades, Wilmington has experienced a steady rate of population loss due to the rise of suburban living, the migration of job opportunities, and other factors. According to the Wilmington website, in 1920, there were approximately 110,000 Wilmingtonians, but the 2010 US Census reported a population of 70,851, which represented a decrease of 2.5% from the 2000 count. Despite successful urban revitalization initiatives that have resulted in stable or thriving neighborhoods in certain sectors, and a new corporate presence in the downtown area, in other parts of the city the landscape remains blighted by abandoned, decaying factories and other properties. In these areas, declines in homeownership have contributed to housing vacancies and the rise of absentee landlords. Abandoned properties, both residential and industrial, are frequently the sites of illegal and illicit activity, have a negative impact on the aesthetics of a community, and are barriers to communitywide progress.

Some neighborhoods have fared worse than others through these transitions. Known as environmental justice communities, these neighborhoods bear a disproportionate amount of environmental risk due to their proximity to sources of contamination and other unsafe conditions. A 2003 report by the University of Delaware Center for Energy and Environment (CEEP) describes these environmental inequities:

African American communities in Wilmington are home to 64% of the City's contaminated land, 80% of abandoned tannery sites, 30% of toxic release inventory sites, 73% of hazardous waste generators, 60% of combined sewer overflows, and 56% of NPDES general wastewater discharge permit holders. None of the water bodies in African American communities support fish that are safe to eat. African American communities, therefore, are confronted by disproportionately high environmental risks in the City of Wilmington. (CEEP, 2003, p86)

Environmental justice communities are primarily comprised of minority and underserved populations with high rates of poverty and unemployment. Northeast Wilmington reflects the profile of an environmental justice community and therefore stands to benefit significantly from brownfield development.

Northeast Wilmington: The Test Kitchen for Social Impact Assessment of Brownfields Development Programs

There are many neighborhoods throughout Delaware that share characteristics of environmental justice communities. Although some are in rural and suburban settings, most are in urban areas. Our study area of Northeast Wilmington, which is shown on the map on the following page (Figure 1), is adjacent to downtown, encompasses 815 acres, and includes the neighborhoods of Price's Run, Riverside, 11th Street Bridge, Eastlawn,

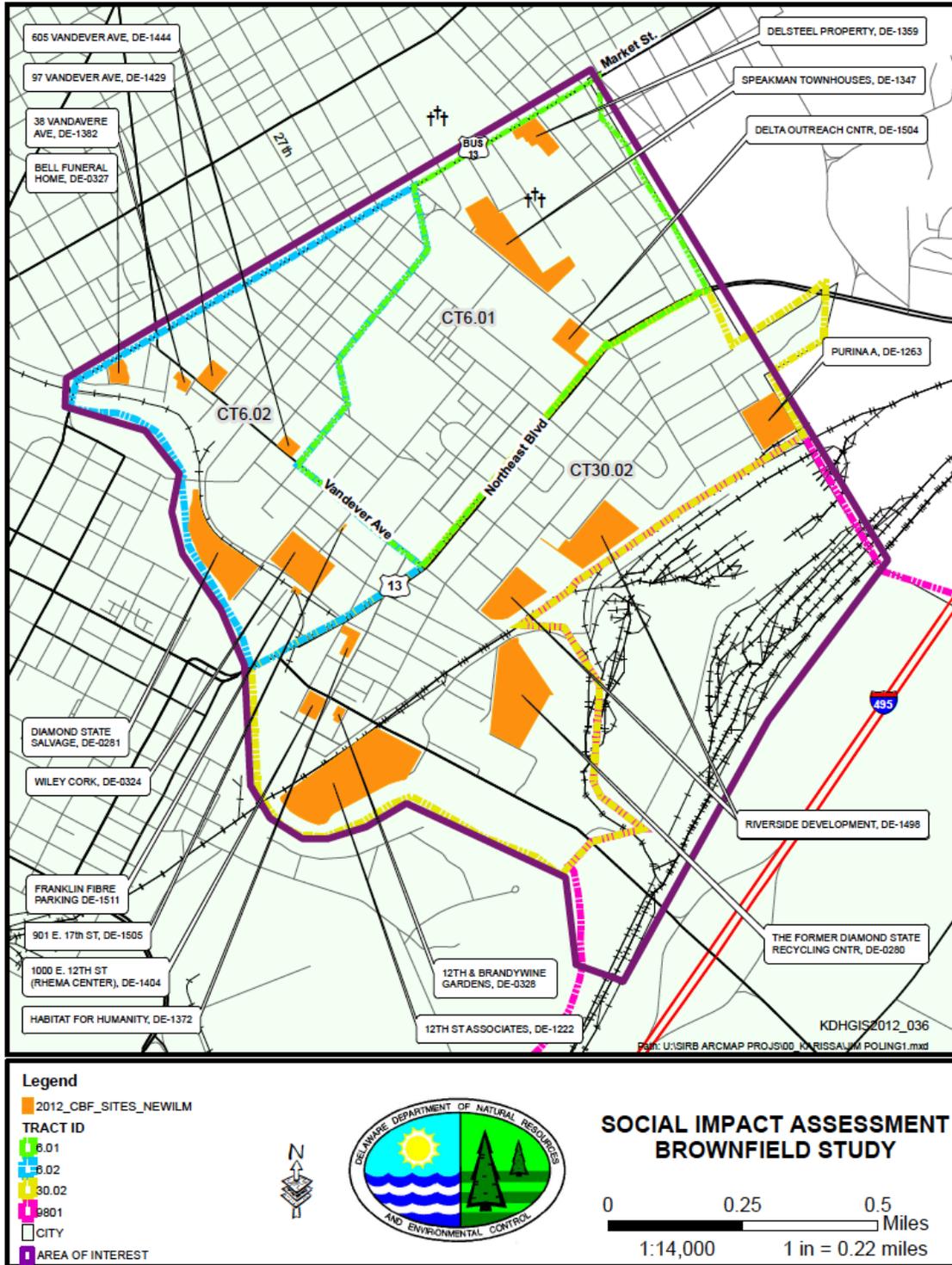


Figure 1: Certified Brownfields in Northeast Wilmington – 2012

Eastlake, and parts of the Greater Brandywine Valley. Market Street to the west, the City limits to the north, the Amtrak viaduct to the east, and the Brandywine River to the south form its borders. The area, which lies within a flood plain of the Delaware River and slopes towards the Brandywine and Delaware Rivers, had early industrial roots as a milling region.

Market Street and Northeast Boulevard/Governor Printz Boulevard are the main traffic arteries, and these, along with Vandever Avenue and East 12th Street, are state-maintained roads. Four Delaware Transit Corporation (DART 1st State) bus lines service Northeast Wilmington. DART 1st State Paratransit also provides specialized transportation services to eligible residents. The area is easily accessible to Interstates 95 and 495, and US Routes 202 and 13.

Although Northeast Wilmington is mainly a residential area, land is also zoned for commercial, manufacturing (heavy and light), and waterfront mixed purposes. Institutional, public, and quasi-public entities exist there as well, such as the Wilmington Housing Authority, the Westside Family Healthcare Clinic, the Kingswood Community Center, the Job Corps campus, Habitat for Humanity county headquarters, the Howard R. Young Correctional Institute (also known as Gander Hill Prison), and a number of schools and faith-based organizations. There are approximately 33 acres of open space, including some park and recreational areas. Although the Brandywine River forms the southern boundary of the area, due to former industrial use, very little of the waterfront is safely accessible to residents for recreation.

Northeast Wilmington consists of US Census tracts: 6.01, 6.02, and 30.02 (former tracts 7 and 8 were combined to create tract 30.02). According to the most recent census there are 8,834 people residing in the three tracts combined, a decline of over 1,000 residents since the 2000 count (US Census 2010, 2000). Census-based data and public records (such as health, crime, and licensing and inspection reports) illustrate that this is a socially and economically distressed region:

- The community is comprised mostly of minority residents who face disproportionate rates of unemployment and poverty, as well as health and educational disparities (US Census, 2000, 2010).
- In 1999, more than one-third of these families (many headed by women) were living below the poverty level (US Census, 2000).
- Residents also experience high rates of violent and drug-related crime; since 2006, Price's Run (Census track 6.02) has received federal funding through the Weed and Seed Program to combat these issues. (US Census, 2000, 2010; Delaware Statistical

Analysis Center, 2010, 2012; Delaware Department of Public Health, 2012.) Residents have also raised concerns regarding street lighting in specific areas and the presence of vacant or abandoned buildings as magnets for illicit and/or illegal activities (Department of Planning and Development, City of Wilmington, 2012).

- Much of the existing housing stock is aging and distressed. Slightly more than half of the homes in Northeast Wilmington were renter-occupied units, and more than 70% of the dwellings were built before 1960 according to the 2000 US Census.
- Despite former industrial activity, the area currently suffers from a lack of business and employment opportunities.
- Former industrialization has contributed to a significant degree of environmental contamination in the area; to date, 18 properties have been state-certified as brownfields, representing approximately 11% of all certified brownfields throughout Delaware (DNREC, 2012).
- According to the City of Wilmington's Department of Planning and Development, there are several large and dozens of small vacant properties throughout the area (2012).

Brownfields Development in Northeast Wilmington

Because it is an environmental justice community with a high degree of brownfield regeneration, Northeast Wilmington is an ideal setting in which to pilot test select elements of brownfield program evaluation. Figure 1 shows the location of all brownfields in Northeast Wilmington that have been certified since the BDP began.¹⁰ Some projects, like Speakman Place, are “up and running,” while others brownfields are still in the environmental investigation and remediation phases. Several projects that were initiated now remain dormant while developers seek the funding necessary to complete the new development or have abandoned their plans.

Brownfield regeneration in Northeast Wilmington ranges from very small properties that have been or will be incorporated into small private businesses, to larger lots intended for community services and activities, to major housing developments. The following is a brief description of certified brownfield development initiatives throughout the community.¹¹

¹⁰ When considering the percentage of environmentally compromised properties in a given area, it is important to remember that state-certified brownfields represent only abandoned, vacant, or underutilized properties in which a developer has shown interest. Properties remaining in use and properties where no one has shown an interest in redevelopment may be potential brownfields. Superfund sites represent a distinct environmental hazard.

¹¹ Appendix C includes a table describing property details for the state-certified brownfields in this study.

State-Certified Brownfields in Census Tract 6.01

Speakman Townhomes

One of the earliest (2005) and largest brownfields to be certified in Northeast Wilmington was the six-acre site of the abandoned Speakman factory where plumbing supplies had been manufactured for almost a century. Nonprofit Cornerstone West Community Development Corporation partnered with a private company, Ingerman Affordable Housing, to promote neighborhood stabilization through the creation of safe and affordable housing. The timeline for development was expedited when a fire broke out after the initial investigation was completed, and the aftermath posed hazards to the neighborhood due to the factory's structural instability.



Figure 2: Former Speakman Factory

Speakman Place is a 71-unit mixed-income housing development. Half of the homes were sold to buyers with household median incomes at or below the New Castle County median and the balance were sold to buyers, with no income restrictions, at market rate. Units were constructed as they were sold, and Cornerstone West worked extensively with purchasers during the mortgage qualification phase. Speakman Place is completely developed and fully occupied.



Figure 3: Speakman Place Townhomes



DelSteel Property

DelSteel, not far from the Speakman property, was a former steel manufacturing facility that was purchased by the privately owned Eastern States Development Company, Inc. The half-acre site, known as McMullen Square, is being converted into 38 affordable townhomes. Similar to the Speakman project, the homes are being constructed as they are sold. However, sales began to slow in response to the economic impacts that emerged in 2008. Currently, 18 homes are occupied, two additional units have been sold, one unit is

open, and 17 units are yet to be constructed. Developers anticipate construction to be completed with in the next 5 years.



Figure 4: DelSteel Property - Before and After

605 Vandever Avenue

Our Youth, Inc., a local nonprofit that serves at-risk youths undertook a smaller housing development project at 605 Vandever Avenue. The half-acre property, which previously housed an auto repair facility, has been remediated and five affordable townhomes have been constructed with the potential for five additional dwellings to be built.

Delta Outreach

One of the most recently certified lots is a former ball field and office building located at 330 East 30th St. The 1.62-acre property is being developed by Delta Outreach and Educational Center, Inc. who intend to construct an educational and vocational community center. Remediation will begin after Delta Outreach submits the final development plan to DNREC and it is approved.

Purina Tower A or Brandywine School District Transportation Property

The site of the former Purina pet food manufacturing operation was certified in 2010 when the Brandywine School District submitted an application to develop the property for transportation and administrative services. It is one of the most complex brownfield initiatives for several reasons. The almost 8 acres of property includes multiple tax parcels, some within the city limits and some within county jurisdiction. In addition, the ground that the tower sits on is not part of the property being developed and remains in use as a cellular tower. Some of the property being developed does not qualify as a brownfield but is part of the Voluntary Cleanup Program. The Brownfield Investigation is in the process of being revised to clarify which parcels will be addressed through which program.

State-Certified Brownfields in Census Tract 6.02

Wiley Cork Factory

In 2005, DNREC certified the site of the former Wiley Cork Factory, a 3.79-acre lot that the New Destiny Fellowship Church/Destiny Community Development Corporation planned to

develop for community services. Developers originally intended to rehabilitate the abandoned factory and convert it into a community health and daycare facility. However, the existing structure was significantly comprised and it was deemed more cost effective to raze the building and remediate the property by removing existing soil and replacing it with a 2-foot soil cap. The tarmac-covered area is now a multi-purpose space for the Church and CDC. The developers are continuing to seek resources for ongoing development to meet the needs of their constituents and other community members.



Figure 5: Remains of the Former Wiley Cork Factory (left), and the Remediated Site (above)

38 Vandever Avenue

Recently, Kappa Mainstream Leadership, Inc., secured brownfield funding to complete remediation and construction on a .32-acre lot on Vandever Avenue. The facility will be used to provide education and outreach services to at-risk, underserved youths, in line with the organization’s national mission. The facility will also most likely house a community reentry program for released prisoners. In addition, as available, space will be used by various community organizations for meetings and other activities.



Figure 6: 38 Vandever Avenue - Before and After Remediation

97 Vandever Avenue – Habitat for Humanity

97 Vandever Avenue is one of three brownfield development projects in Northeast Wilmington undertaken by Habitat for Humanity of New Castle County (NCC). The NCC chapter of Habitat, which is also headquartered in the study area, has concentrated efforts in this region in order to provide safe and affordable housing and promote community engagement as strategies for neighborhood revitalization.



Figure 7: 97 Vandever Avenue - Before Development (left) and After Construction of New Habitat for Humanity Townhomes (right)

In this project, various elements of remediation and development are occurring simultaneously on the .3-acre lot, which is common in many housing initiatives. Six houses were recently completed with owners taking residence in late Spring 2012. An additional six houses are under construction and nine remaining units are being framed out.

Diamond State Salvage

In the late 1990s, the EPA designated the former site of Diamond State Salvage, located at 702 East 14th Street, a Superfund site. Diamond State Salvage had been an oil refinery and mixed-scrap salvage yard. The EPA performed an aggressive cleanup to remove heavy metals, etc., and donated the property to the City of Wilmington. The property was originally intended for biking trails and other development. Depending upon the final development plan, the site will require additional evaluation and remediation. The site was state-certified as a brownfield in 2008 but due to resource limitations further development has not been proposed or initiated.

901 East 17th Street

The Vandever Avenue Civic Association submitted an application for brownfield certification of a dry cleaning site located at 901 East 17th St. Once remediated, the Civic Association plans to create a neighborhood greenspace and community garden. The final remedial work plan has been submitted. Remediation will likely involve removal and replacement of contaminated soil to a specific depth. Because the land will be used to grow plants and produce it was necessary for DNREC to discuss with community members safe

guidelines specific to vegetation with various root systems. The group hopes to complete all remediation and begin cultivation in 2012.

Franklin Fibre Parking Site

Another small (0.08-acre) brownfield is located at 909 East 14th Street, adjacent to the Franklin Fibre-Lamitex Corporation. The site was certified in 2011. Once remediated, the land will be used for additional parking for the Franklin Fibre manufacturing plant. The property was previously used for industrial purposes and as a railroad bed.

Bell Funeral Home

The former site of Bell Funeral Home on North Market Street was state-certified in 2006. The prospective developer, Brandywine Village, LLC, walked away from the project before the investigation was completed and the project remains dormant.

State-Certified Brownfields in Census Tract 30.02 (formerly 7 & 8)

Thatcher and North Heald Streets – Habitat for Humanity

One of the earliest brownfield regenerations in Northeast Wilmington, and the first of the three Habitat for Humanity initiatives in the area, is the townhomes at Thatcher and Heald Streets. At various times, the property previously housed a foundry, scrap iron yard, repair shops, and other manufacturing operations. Certified in 2005, the .7-acre lot has been developed into 16 affordable townhomes now occupied.



Figure 8: Former Brownfield at Thatcher and Heald Streets (left) and Same Site after Construction of New Habitat for Humanity Townhomes (right)

1000 East 12th Street – Habitat for Humanity

Habitat for Humanity has also proposed development of townhomes at the location of a former plumbing warehouse and industrial site at 1000 East 12th Street, in close proximity to the Thatcher and Heald Street site. The final plan for remediation was publicly noticed for open comment in early 2012, and remediation was to have commenced following approval of the final plan for development.

Riverside Development/Kingswood Community Center

The Wilmington Housing Authority, a quasi-public development corporation, established interest in redeveloping approximately 7 acres of certified brownfield located at 2300 Bowers Street. Proposed development included affordable housing and a community hub for education and training facilities in conjunction with Kingswood Community Center, a longstanding civic presence in the region. Developers applied for but were not awarded federal funding, so the residential development has not commenced. However, the initial investigation was conducted.

Naga Foods

In 2005, a former forklift repair company at 909 East 14th Street was certified as a brownfield when a prospective developer proposed to remediate the site in order to manufacture banana chips. Approximately a year after the original developer discontinued the project, a second prospective developer came forward with a plan to construct a roofing and contracting shop. Remediation and development has been completed.

12th and Brandywine Streets

Property at 12th and Brandywine Streets is an atypical example of a certified brownfield. First State Resource Conservation and Development Council, Inc., applied for and obtained brownfield certification in 2006 for the former residential property. First State was interested in developing the property as a community garden, and, because much of Wilmington is built on industrial fill soil, there was concern the site may have required remediation. The developer never moved forward with the BDP to investigate or remediate the property. However, the property is currently in use as a popular community garden.

Former Diamond State Recycling

Another unusual example of a certified brownfield is the Former Diamond State Recycling plant. In 2011, Simsmetal East, LLC, a private developer, requested brownfield certification for the currently operational recycling plant on the basis that it was being underutilized. According to the Delaware brownfield statute, underutilization is one of the eligibility criteria for certification. The intended development was to expand and upgrade the current recycling operations. After certification was granted, and limited remedial investigation was conducted, the prospective developer declined to pursue development. Because preliminary investigation revealed the presence of contaminants, and the site is operational, the current owner is now responsible for environmental cleanup.

Findings – Changes in Social Indicators

A major benefit of using the SIA approach is that researchers are able to draw upon qualitative methods to interpret and supplement quantitative data. The next section includes the findings relevant to selected indicators in the following domains: demographics; neighborhood economy; health and safety; and cultural/aesthetics. Key informant findings, which provide insights regarding community members' perceptions

(notably relating to civic engagement, interaction, and pride, but addressing other indicators as well) are then reported. Finally, perceptions regarding the Delaware BDP are discussed.

Demographics

Population

According to census data, 9,926 residents populated the aggregate study area in 2000. That number decreased to 8,834 by 2010, representing an 11% decline, which was appreciably higher than the decrease of 2.5% experienced in the entire city (US Census 2000, 2010).

Interestingly, while population decreased in tracts 6.02 (by 15.3%) and 30.02 (by 20%), the population increased in census tract 6.01 by 7.6% with an additional 206 residents. Speakman Townhomes, and the completed portions of McMullen Square and Our Youth, Inc., three brownfield sites where there has been construction of new and affordable housing, may account to some degree for the increased population in this tract.

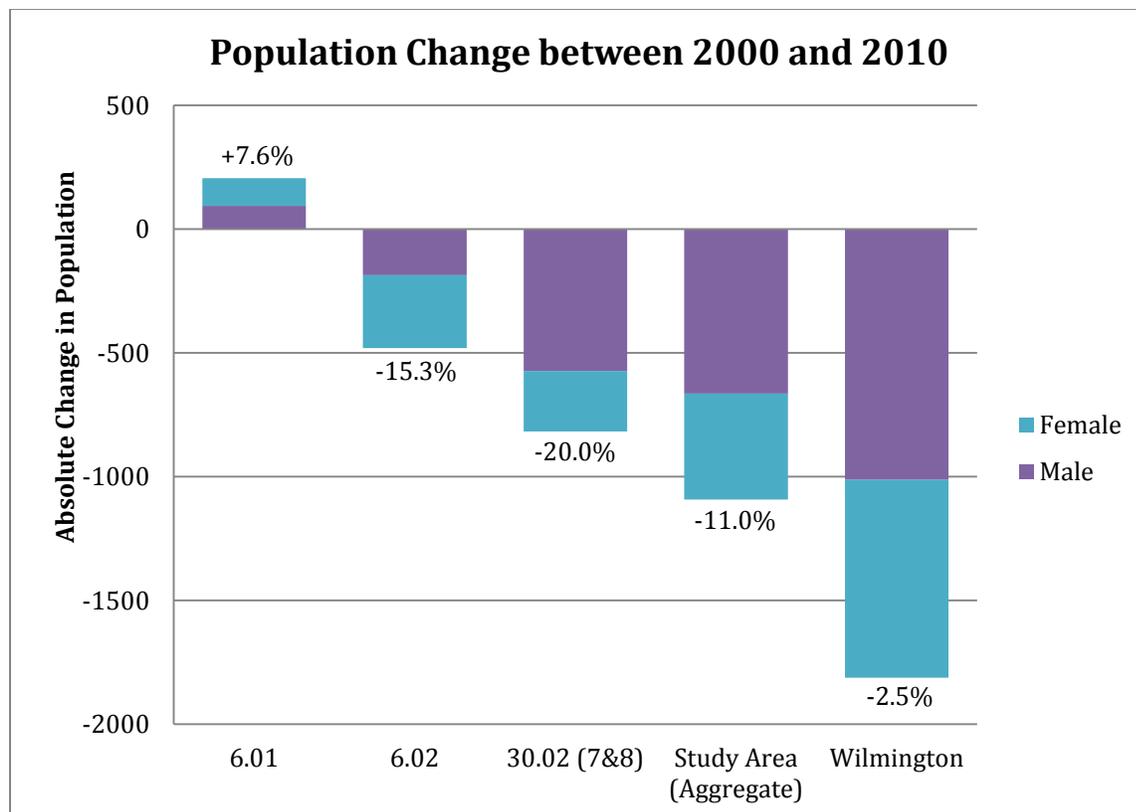


Figure 9: Population Change by Sex in Census Tracts in Study Area, Aggregate Study Area, and the City of Wilmington between 2000 and 2010 (Source - US Census 2000, 2010)

Race

From 2000 through 2010 there was little change in the overall racial composition of the aggregate study area. In 2010, Black/ African-Americans comprised 84.6% of the total population, up just slightly from 84.5% in 2000. Whites comprised 11.8% and 11.65% of the population in 2000 and 2010, respectively. Asians, American Indian/Alaska Natives, as well as Native Hawaiian/Pacific Islanders each accounted for less than 1% in both 2000 and 2010 (US Census 2000, 2010).

There was a small change in the percentage of residents in Northeast Wilmington who are Hispanic/Latino.¹² In 2000, approximately 3.5% of the population self-identified as Hispanic/Latino; in 2010 that increased to almost 5%. In both 2000 and 2010, approximately two-thirds of the Hispanic/Latino population was Puerto Rican (US Census 2000, 2010).

At the census tract level, some relatively small changes were observed. In tract 6.01 (where there was an overall population increase of 7.6%) the Black/African-American population increased by 9.6% and the White population decreased by 8.6%. In 2000, Hispanic/Latinos comprised 0.03% of the residents living in tract 6.01 which increased to 0.05% by 2010. This represented an increase in Hispanic/Latinos residents of 43% (US Census 2000, 2010).

In census tract 6.02 (which experienced an overall decline in population of 15.3%) the percentage of Black/African-Americans increased by 14.2% throughout the decade while the population of Whites decreased by almost 29% from 2000 to 2010. There appeared to be no change in the percentage of Hispanic/Latino residents, which remained at 0.03% of the total population of tract 6.02 (US Census 2000, 2010).

Despite combining former tracks 7 and 8 to create the new census tract 30.02 for the 2010 US Census, the total population of the area decreased by almost 20%. The Black/African-American and White populations decreased by 22.8% and 6.6%, respectively. However, the percentage of Hispanic/Latino residents in the area 30.02 rose from 0.037 in 2000 to 0.068 in 2010 (US Census 2000, 2010).

¹² The US Census and American Community Survey provides data on race (White, Black/African-American, Asian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, or Other). In addition, participants identify themselves as either Hispanic/Latino or Non-Hispanic/Latino.

Census Tract	Year 2010				Year 2000				Year 2010				Year 2000			
	6.01	6.01	Change	% Change	6.02	6.02	Change	% Change	30.02	7 & 8	Change	% Change	30.02	7 & 8	Change	% Change
Total population	2910	2704	206	7.62%	2649	3129	-480	-15.34%	3275	4,093	-818	-19.99%	3275	4,093	-818	-19.99%
One race	2852	2,656	196	7.38%	2568	3063	-495	-16.16%	3245	4,071	-826	-20.29%	3245	4,071	-826	-20.29%
White	191	209	-18	-8.61%	188	264	-76	-28.79%	650	696	-46	-6.61%	650	696	-46	-6.61%
Black/African-American	2602	2374	228	9.60%	2333	2720	-387	-14.23%	2540	3,292	-752	-22.84%	2540	3,292	-752	-22.84%
American Indian/Alaska Native	8	3	5	166.67%	14	5	9	180.00%	3	6	-3	-50.00%	3	6	-3	-50.00%
Asian	9	4	5	125.00%	12	25	-13	-52.00%	4	1	3	300.00%	4	1	3	300.00%
Native Hawaiian/Other Pacific Islander	0	0	0	0.00%	0	0	0	0.00%	0	0	0	0.00%	0	0	0	0.00%
Some other race	42	66	-24	-36.36%	21	49	-28	-57.14%	48	76	-28	-36.84%	48	76	-28	-36.84%
Two or more races	58	48	10	20.83%	81	66	15	22.73%	30	22	8	36.36%	30	22	8	36.36%
HISPANIC/LATINO																
Total population	2910	2704	206	7.62%	2649	3,129	-480	-15.34%	3275	4,093	-818	-19.99%	3275	4,093	-818	-19.99%
Hispanic or Latino (of any race)	133	93	40	43.01%	81	102	-21	-20.59%	225	153	72	47.06%	225	153	72	47.06%
Mexican	22	24	-2	-8.33%	8	37	-29	-78.38%	29	21	8	38.10%	29	21	8	38.10%
Puerto Rican	91	55	36	65.45%	66	52	14	26.92%	162	116	46	39.66%	162	116	46	39.66%
Cuban	1	0	1	n/a	1	1	0	0.00%	2	2	0	0.00%	2	2	0	0.00%
Other Hispanic or Latino	19	14	5	35.71%	6	12	-6	-50.00%	32	14	18	128.57%	32	14	18	128.57%
Not Hispanic or Latino	2777	2611	166	6.36%	2568	3,027	-459	-15.16%	3050	3,940	-890	-22.59%	3050	3,940	-890	-22.59%
RACE/HISPANIC OR LATINO																
Total population	2910	2704	206	7.62%	2649	3,129	-480	-15.34%	3275	4,093	-818	-19.99%	3275	4,093	-818	-19.99%
One race	2852	2,656	196	7.38%	2568	3,063	-495	-16.16%	3245	4,071	-826	-20.29%	3245	4,071	-826	-20.29%
Hispanic or Latino	117	83	34	40.96%	59	87	-28	-32.18%	213	147	66	44.90%	213	147	66	44.90%
Not Hispanic or Latino	2735	2573	162	6.30%	2509	2,976	-467	-15.69%	3032	3,924	-892	-22.73%	3032	3,924	-892	-22.73%
Two or more races	58	48	10	20.83%	81	66	15	22.73%	30	22	8	36.36%	30	22	8	36.36%
Hispanic or Latino	16	10	6	60.00%	22	15	7	46.67%	12	6	6	100.00%	12	6	6	100.00%
Not Hispanic or Latino	42	38	4	10.53%	59	51	8	15.69%	18	16	2	12.50%	18	16	2	12.50%

Figure 10: Change in Race and Ethnicity in Census Tracts 6.01, 6.02, 30.02 between 2000 and 2010 (Source - US Census 2000, 2010)

Census Tract	Year	2010	2000			2010	2000		
		Entire Study Area	Change	% Change		Wilmington	Change	% Change	
Total population		8834	9926	-1092	-11.00%	70851	72664	-1813	-2.50%
One race		8665	9790	-1125	-11.49%	69024	71240	-2216	-3.11%
White		1029	1169	-140	-11.98%	23079	25811	-2732	10.58%
Black/African-American		7475	8386	-911	-10.86%	41127	41001	126	0.31%
American Indian/Alaska Native		25	14	11	78.57%	312	185	127	68.65%
Asian		25	30	-5	-16.67%	685	473	212	44.82%
Native Hawaiian/Other Pacific Islander		0	0	0	0.00%	10	20	-10	50.00%
Some other race		111	191	-80	-41.88%	3811	3750	61	1.63%
Two or more races		169	136	33	24.26%	1827	1424	403	28.30%
HISPANIC/LATINO									
Total population		8834	9926	-1092	-11.00%	70851	72664	-1813	-2.50%
Hispanic or Latino (of any race)		439	348	91	26.15%	8788	7148	1640	22.94%
Mexican		59	82	-23	-28.05%	3060	1746	1314	75.26%
Puerto Rican		319	223	96	43.05%	4404	4328	76	1.76%
Cuban		4	3	1	33.33%	116	87	29	33.33%
Other Hispanic or Latino		57	40	17	42.50%	1208	987	221	22.39%
Not Hispanic or Latino		8395	9578	-1183	-12.35%	62063	65516	-3453	-5.27%
RACE/HISPANIC OR LATINO									
Total population		8834	9926	-1092	-11.00%	70851	72664	-1813	-2.50%
One race		8665	9790	-1125	-11.49%	69024	71240	-2216	-3.11%
Hispanic or Latino		389	317	72	22.71%	8137	6618	1519	22.95%
Not Hispanic or Latino		8276	9473	-1197	-12.64%	60887	64622	-3735	-5.78%
Two or more races		169	136	33	24.26%	1827	1424	403	28.30%
Hispanic or Latino		50	31	19	61.29%	651	530	121	22.83%
Not Hispanic or Latino		119	105	14	13.33%	1176	894	282	31.54%

Figure 11: Change in Race and Ethnicity in the Aggregate Study Area and Wilmington between 2000 and 2010 (Source - US Census 2000, 2010)

Level of Education

There were a number of mixed indicators throughout the study area in terms of educational attainment. From 2000 through 2010, there was a decline of 33% among adult residents who had not completed a 9th grade education, which outpaced the City of Wilmington (a decline of 4.1%), but there was also a decrease of 19.9% of residents in Northeast Wilmington who had obtained a high school diploma or graduate equivalency degree (GED). Another positive indicator was a 41.7% rise in the rate of residents with some level of college education. There was also a 51% increase in the rate of residents who had attained a graduate or professional degree (US Census 2000; American Community Survey, 2006-2010).

From 2000 through 2010, census tract 6.01 experienced the most positive changes in educational attainment indicators. Increases were reported in the rates of residents who had obtained high school diplomas (44%); some amount of college education but no diploma (69%); bachelor's degrees (40%); and graduate or professional degrees (31%) (US Census 2000; American Community Survey, 2006-2010).

Census tract 6.02 also experienced several positive indicators, including a 24.8% drop among residents who had no high school diploma (including those who did not achieve a 9th grade education); a 17% increase among residents who had obtained some level of college education; and a 119% increase among residents who had obtained graduate or professional degrees. However, this was accompanied by a decline among residents who had obtained a high school and bachelor's diploma (44% and 44.7%, respectively) (US Census 2000; American Community Survey, 2006-2010).

Census tract 30.02 also experienced mixed results in terms of changes in educational attainment. From 2000 through 2010, there was a decrease of 59% among residents with no diploma (including those who had not achieved a 9th grade education) and a 38% increase among residents who had obtained some degree of college education. However, there was also a 36% decrease in the rate of high school graduation and a 42% rate of decline among residents with bachelor's degrees. Unlike census tracts 6.01, 6.02, the aggregate study area, and the City of Wilmington, census tract 30.02 experienced a decrease in the rate of residents obtaining graduate or professional degrees (64%)(US Census 2000; American Community Survey, 2006-2010).

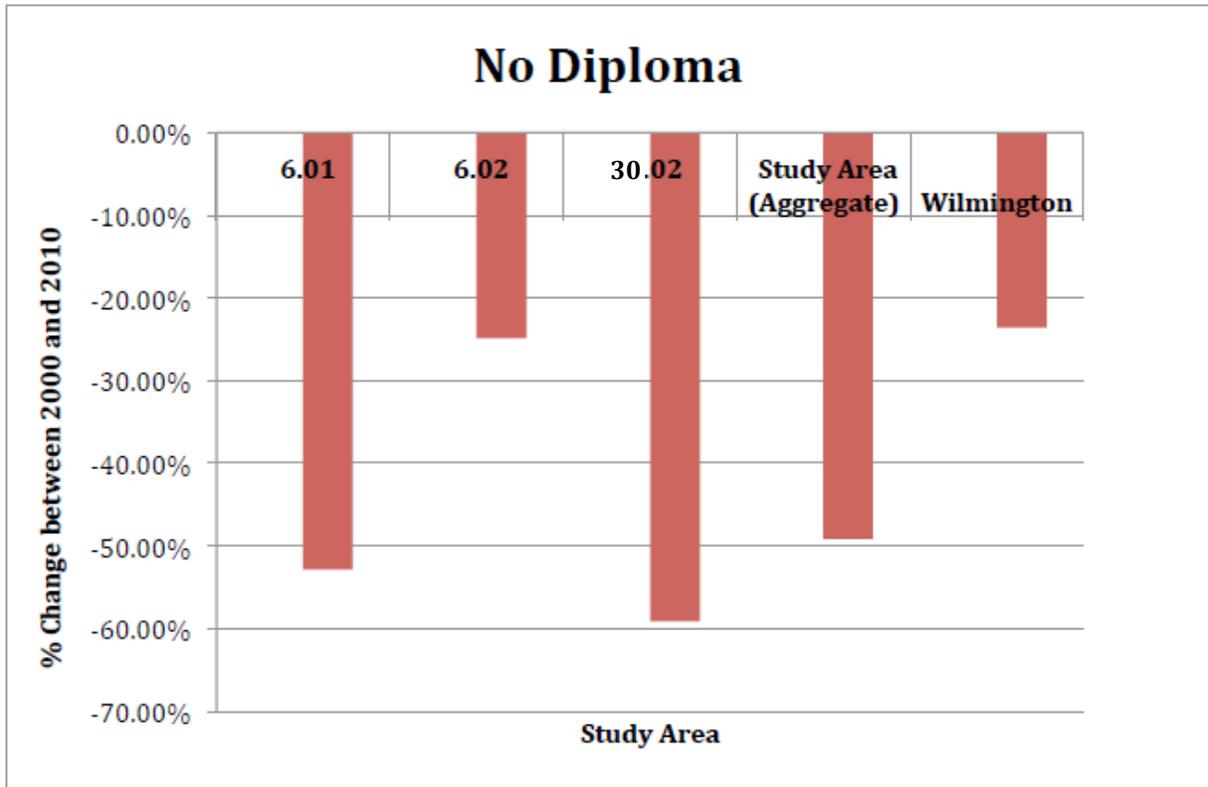


Figure 12: Percent Change in Residents with No Diploma (including residents without 9th grade education) in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010

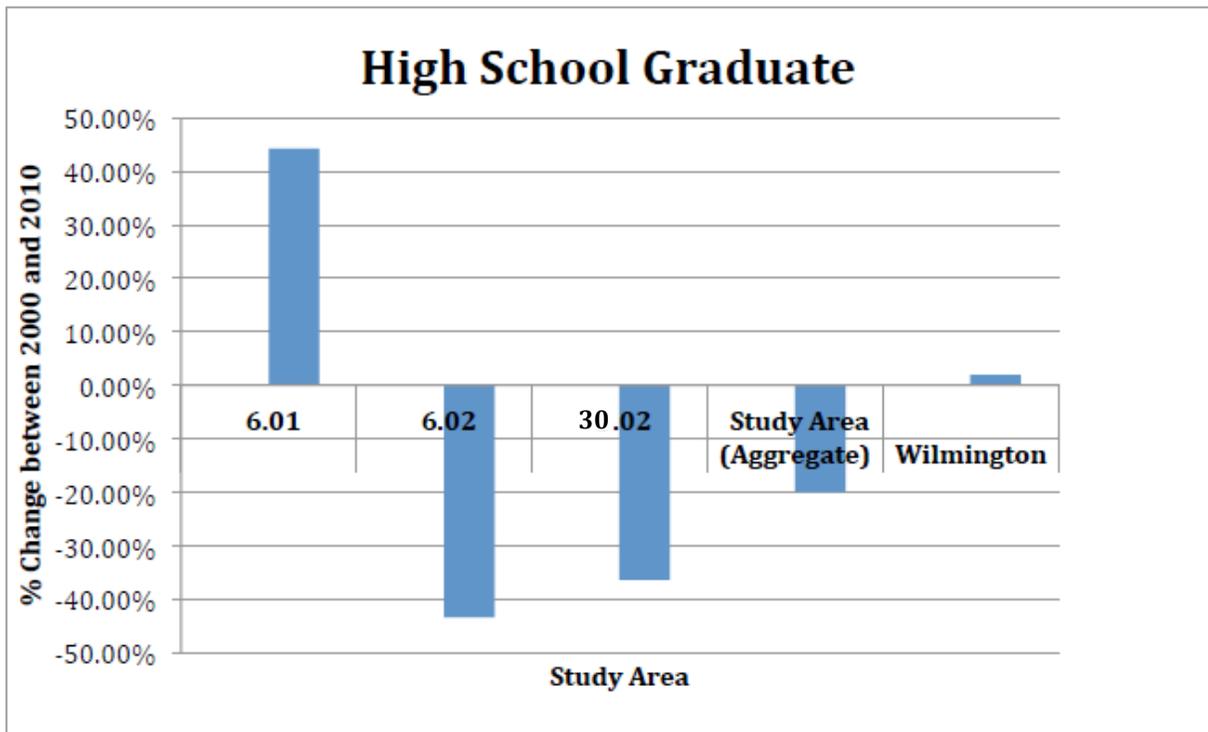


Figure 13: Percent Change in Residents with a High School Diploma (including GED) in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010

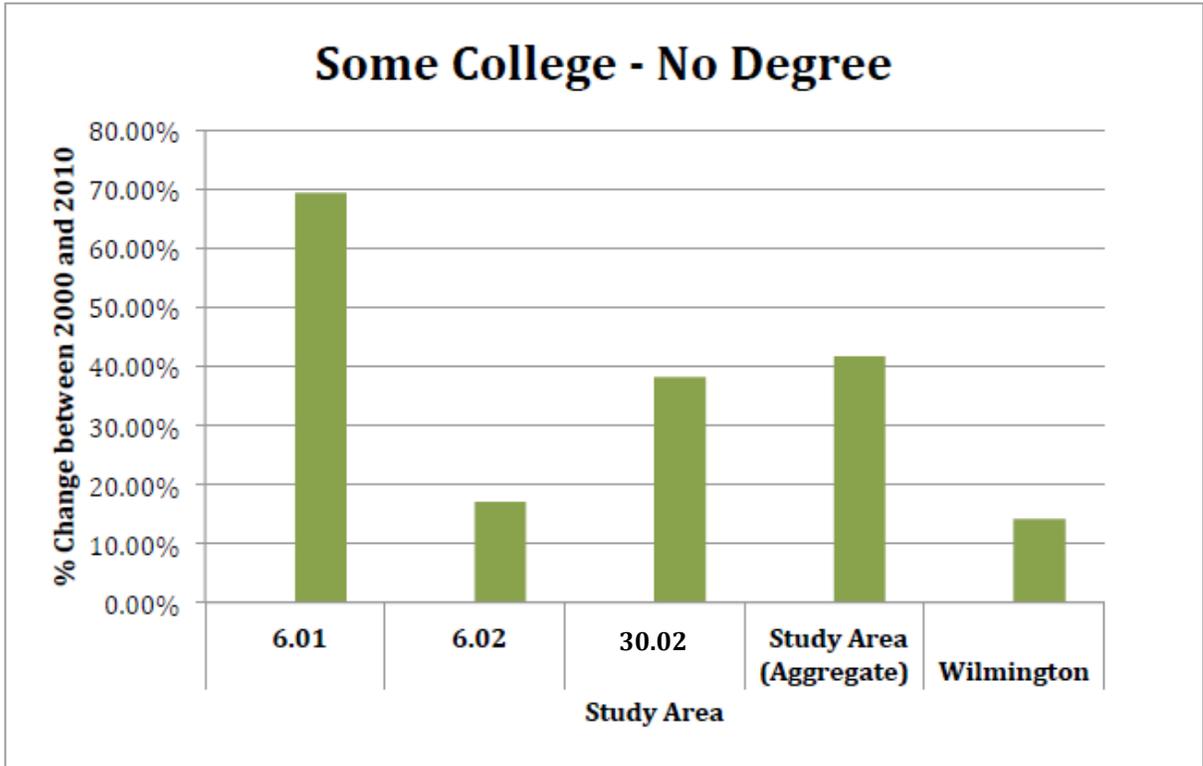


Figure 14: Percent Change in Residents with Some College (but No Degree) in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010

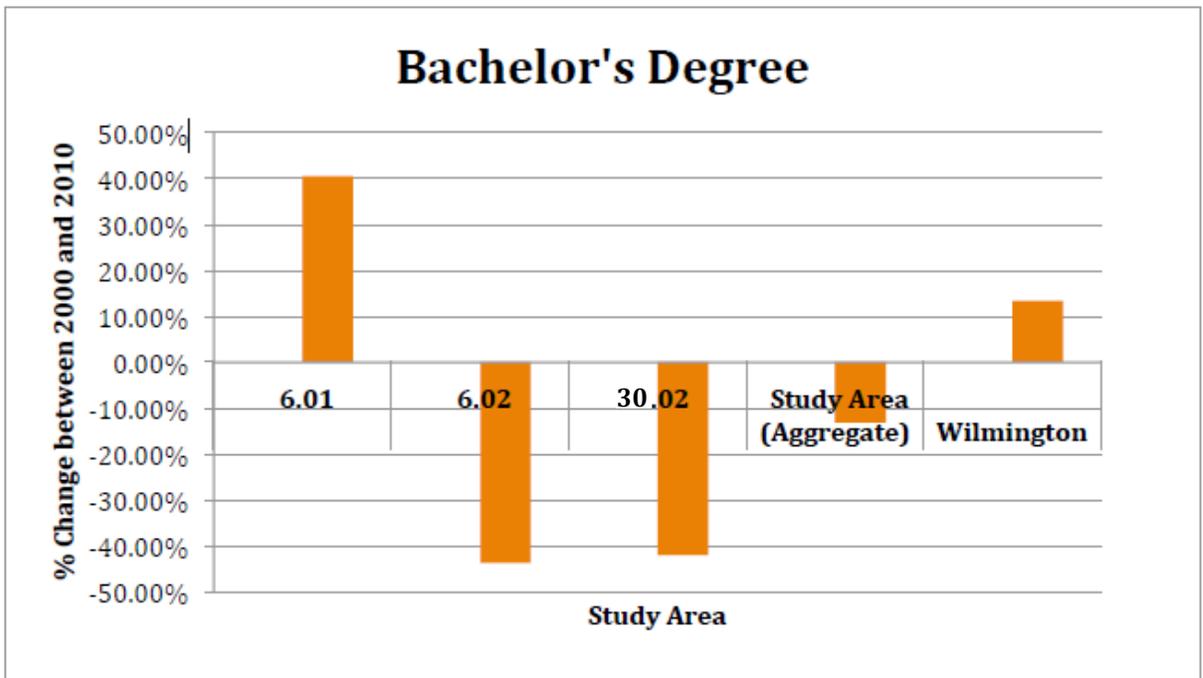


Figure 15: Percent Change in Residents with a Bachelor's Degree in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010

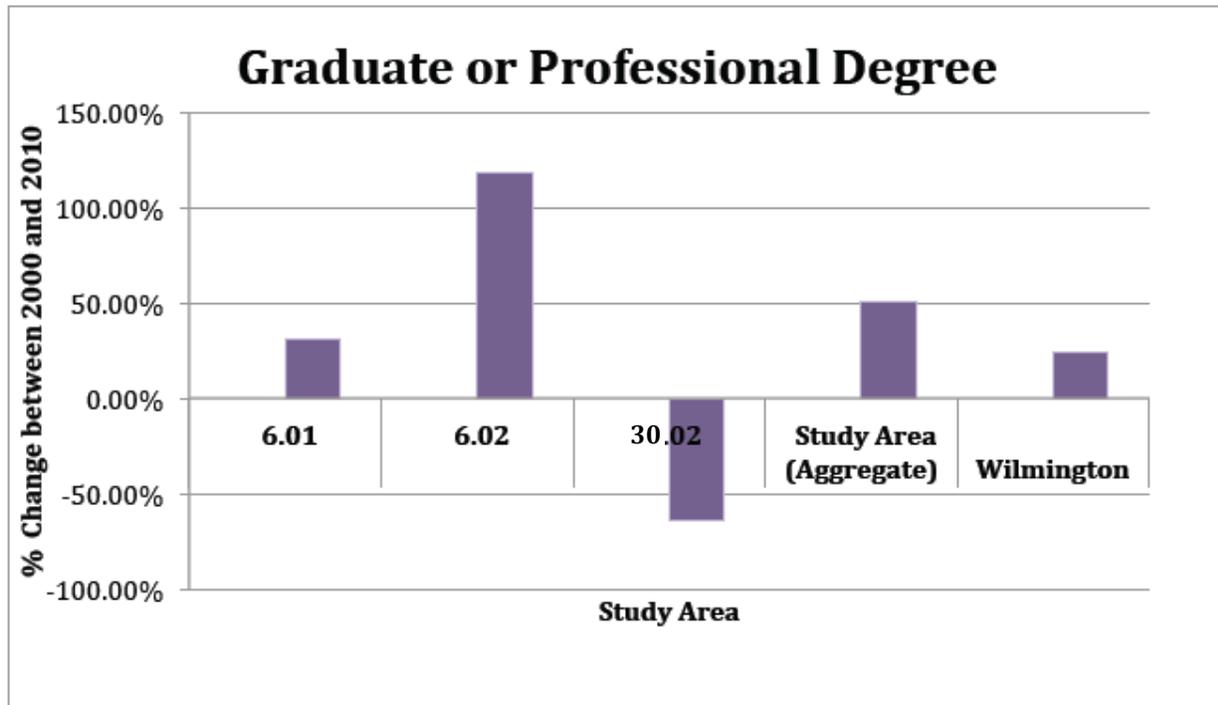


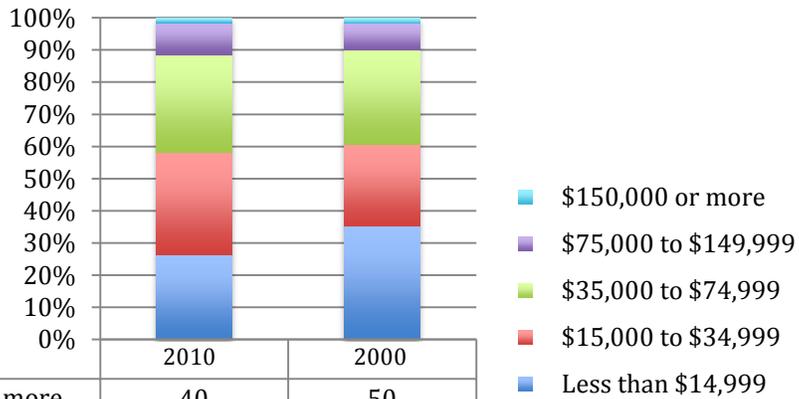
Figure 16: Percent Change in Residents with a Graduate or Professional Degree in Census Tracts, Aggregate Study Area and Wilmington between 2000 and 2010

Income and Poverty

The chart in the figure below depicts a percentage comparison between the 2006-2010 American Community Survey Estimates and the 2000 US Census data on household income in Northeast Wilmington. (The table included provides an actual count of households at given income levels for the two time periods.) Generally, income distribution throughout the aggregate study area remained stable although fewer households (by count and percentage) remained at the lowest income level, and more households reported incomes between \$75,000-\$149,999.¹³

¹³ As of the 2010 US Census, data on income was no longer collected; therefore researchers collected data from the 5-year estimates provided by the American Community Survey for comparison.

Household Income Aggregate Study Area 2010 and 2000



	2010	2000
\$150,000 or more	40	50
\$75,000 to \$149,999	261	230
\$35,000 to \$74,999	794	814
\$15,000 to \$34,999	824	712
Less than \$14,999	689	981

Figure 17: Household Income Levels for Aggregate Study Area in 2010 and 2000 (Source - 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

The following table provides a snapshot of the percentage of change of specific income levels for the each individual census tract, the aggregate study area, and the City of Wilmington:

Annual Household Income	Percent Change in Number of Households				
	6.01	6.02	30.02 (7, 8)	Study Area (Aggregate)	Wilmington
Less than \$14,999	26.79%	-30.38%	-56.93%	-29.77%	-10.23%
\$15,000 to \$34,999	28.96%	-16.39%	50.52%	15.73%	2.02%
\$35,000 to \$74,999	0.59%	-9.12%	4.49%	-2.46%	-6.39%
\$75,000 to \$149,999	58.43%	-13.95%	-25.00%	13.48%	19.71%
\$150,000 or more	100.00%	185.71%	-100.00%	-20.00%	103.62%

Figure 18: Percent Change in Number of Households at Different Income Levels in Census Tracts, Aggregate Study Area and City of Wilmington between 2000 and 2010 (Source - 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

The figure below depicts the percent change in the number of households with income of less than \$14,999 in each individual census tract, the aggregate study area, and the City of Wilmington. Census tract 6.01 experienced a 26.8% increase at households in this income range, while all other areas, notably tract 30.02, experienced declines. Overall, there were 292 fewer households in the aggregate study area at this lowest income level in 2010 compared to 2000, indicating that Northeast Wilmington experienced nearly three times the rate of decrease in the number of households at this income level compared to the City.

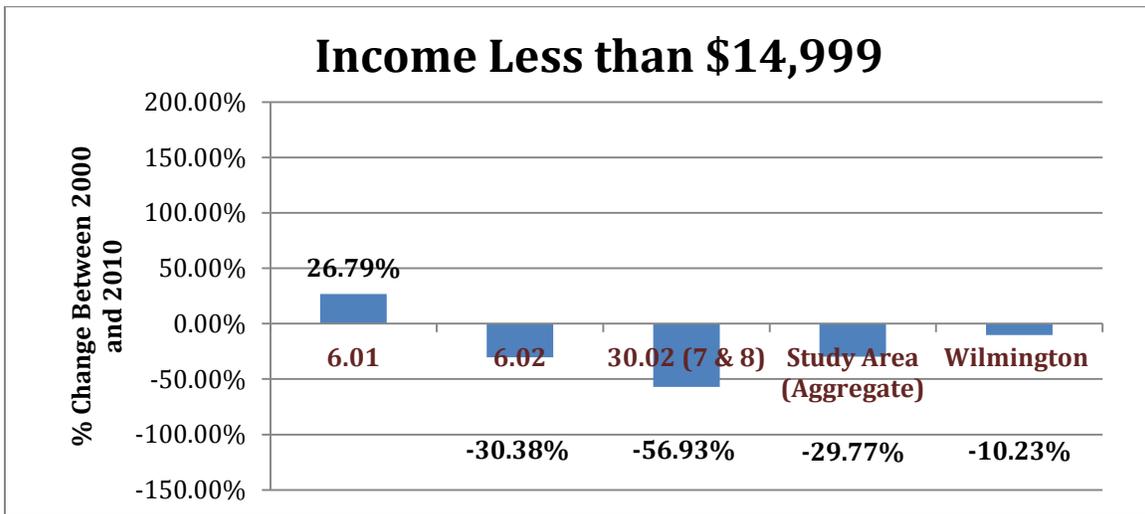


Figure 19: Percent Change in Number of Households with Income Less than \$14,999 in Census Tracts, Aggregate Study Area and the City of Wilmington (Source - 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

The following figure illustrates that the aggregate study area and census tracts 6.01 and 30.02 experienced increases in the rates of households with incomes between \$15,000 and \$34,999. Census tract 30.02 experienced the greatest increase (50.5%), and the aggregate study area experienced a 15.7% increase while the City showed a negligible change.

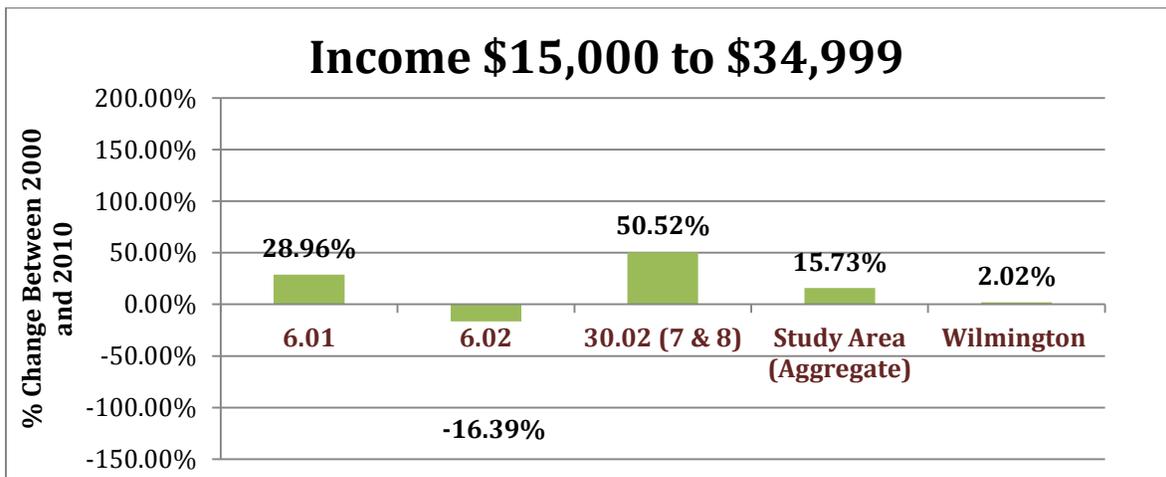


Figure 20: Percent Change in Number of Households with Income between \$15,000 and \$34,999 in Census Tracts, Aggregate Study Area and the City of Wilmington (Source - 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

As shown below, from 2000 through 2010, there was very little change in the percentage of households with income levels between \$35,000-\$74,999 overall. The aggregate study area experienced a 2.5% decrease in households at this level, while tract 30.02 experienced a modest increase of 4.5%.

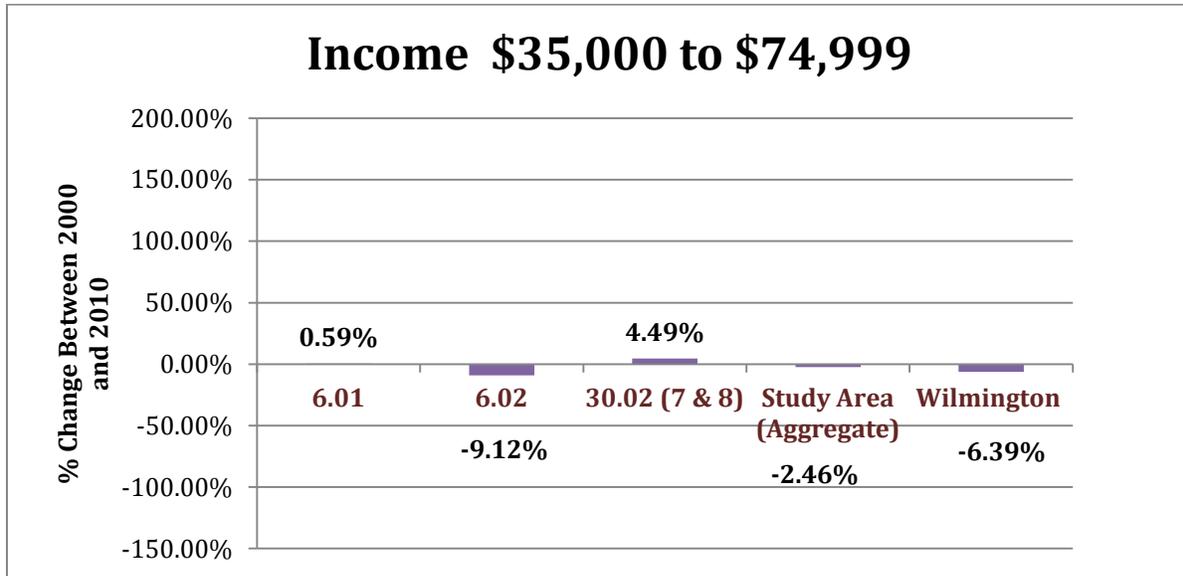


Figure 21: Percent Change in Number of Households with Income between \$35,000 and \$74,999 in Census Tracts, Aggregate Study Area and the City of Wilmington (Source – 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

Although census tracts 6.02 and 30.02 experienced decreases in the percentage of household incomes between \$75,000 and \$149,999, the aggregate study area experienced an increase of 13.5%. This can be attributed to the sharp increase in households at that level of income in tract 6.01 (58.4%). In all, there were 31 more households at this income level in 2010 compared to 2000. The City of Wilmington experienced a slightly higher rate of increase than the study area (19.7%).

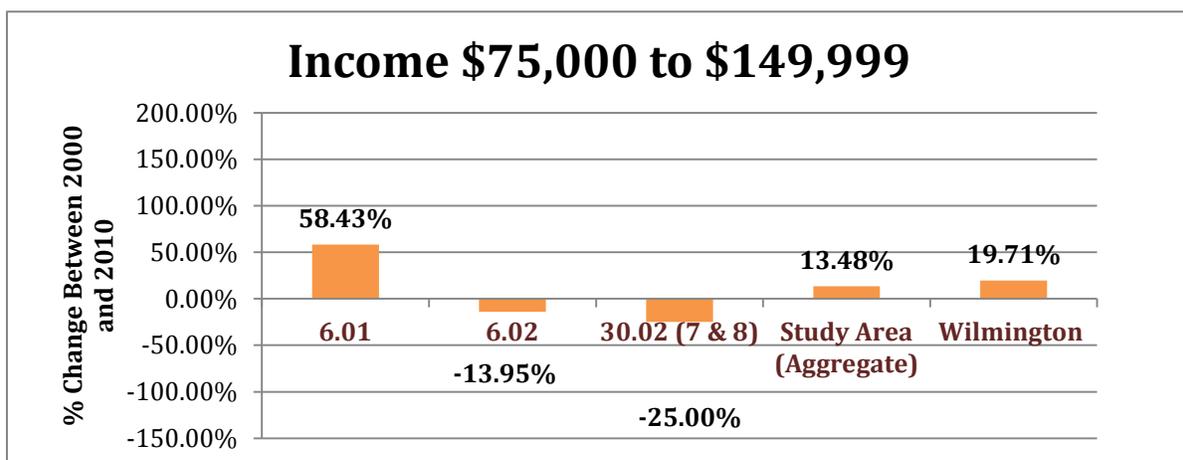


Figure 22: Percent Change in Number of Households with Income between \$75,000 and \$149,999 in Census Tracts, Aggregate Study Area and the City of Wilmington (Source – 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

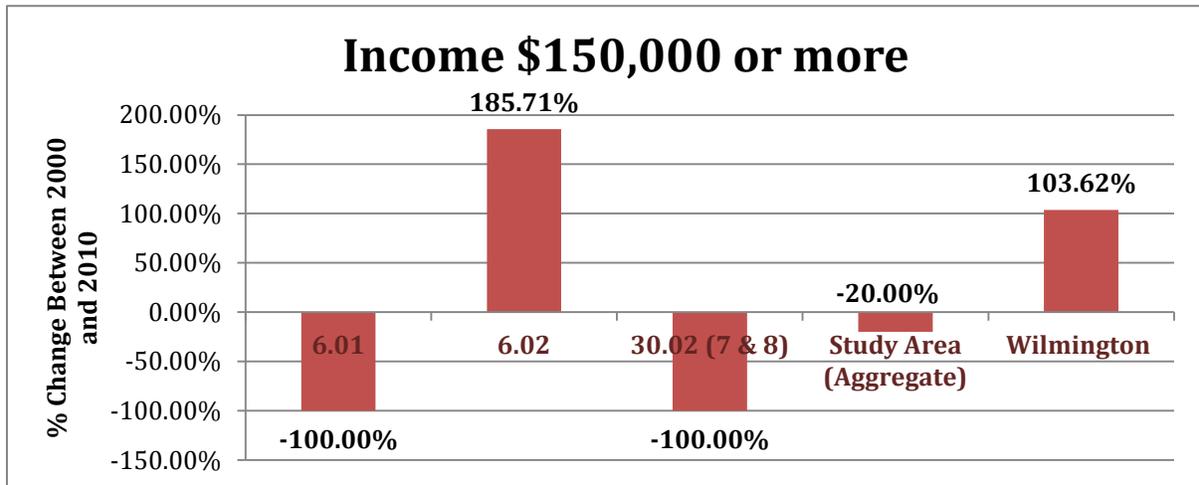


Figure 23: Percent Change in Number of Households with Income of \$150,000 or more in Census Tracts, Aggregate Study Area and the City of Wilmington (Sources – 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

While the City of Wilmington demonstrated a 103.6% rate of increase in households with incomes of \$150,000 or more, Northeast Wilmington demonstrated a 20% decline. Specifically, census tracts 6.01 and 30.02 showed decreases of 100%, although census tract 6.02 demonstrated a 185.7% increase.

Finally, Northeast Wilmington experienced a decline in the rate of individuals living below the poverty line between the years 2000 and 2010 (23.9%). This compares favorably to the City of Wilmington, which experienced a 12.2% increase. However, there was disparity in the rate of change in residents living below the poverty line throughout the study area: census tract 6.01 experienced a 36.8% increase; census tract 6.02 experienced a 31% increase; but census tract 30.02 experienced a decline of 53.1% in residents living in poverty.

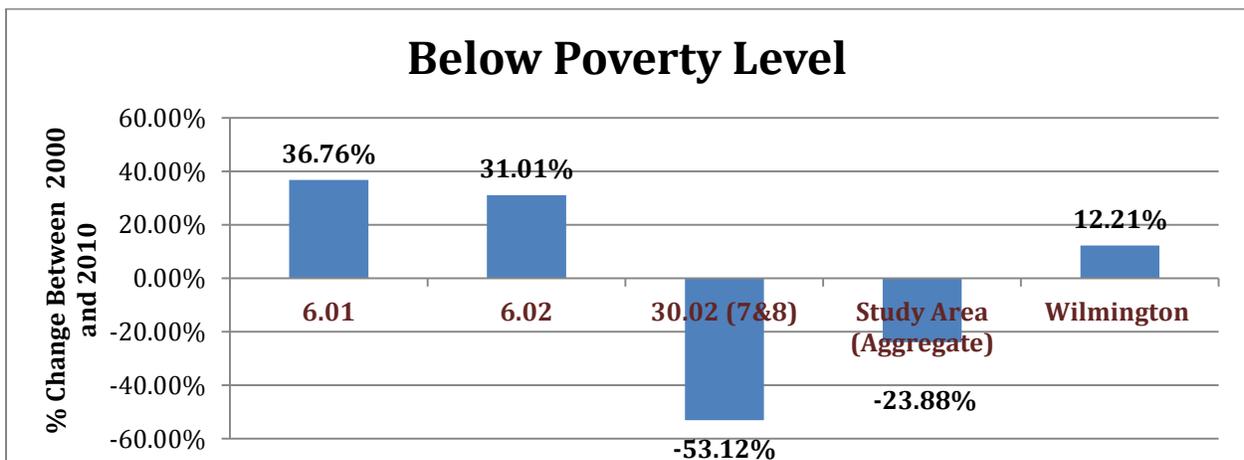


Figure 24: Percent Change in Number of Residents Living Below the Poverty Line in Census Tracts, Aggregate Study Area and the City of Wilmington (Sources – 2000 US Census, 2010 is 5-Year ACS average of 2006-2010)

Neighborhood Economy

Housing

The figure below provides a snapshot of changes in housing units and occupancy rates for the individual census tracts of Northeast Wilmington as well as the aggregate study area. Overall, housing stock in the aggregate study area appears to have decreased by 6.28%. During that same time, housing stock increased slightly in the City of Wilmington (2.12%). There was no apparent change in stock in census tract 6.01, and tracts 6.02 and 30.02 also experienced decreases (9.76% and 8.03%, respectively).¹⁴

Although the rate of occupied housing units in the aggregate study area decreased by almost 10% between 2000 and 2010, the rate of occupied housing units in census tract 6.01 increased by approximately 7%. This appears in line with brownfield regeneration due to two major housing development projects: the completed Speakman Townhomes and the partially completed McMullen Square. In this tract, vacancies among both owner-occupied units and rentals also declined.

¹⁴ Comparison of 2000 and 2010 Census data indicates that total housing stock did not change in tract 6.01, although Speakman Townhomes resulted in 71 new housing units. It is unclear if housing demolition accounts for an offset to the new number. If not, numbers relating to housing stock in the aggregate study area may not be accurate for 2010.

	2010	2000			2010	2000		
Census Tract	6.01	6.01			6.02	6.02		
			Change	% Change			Change	% Change
Data Source	2010 Census	2000 Census			2010 Census	2000 Census		
Total Housing Units	1025	1025	0	0.00%	1322	1465	-143	-9.76%
Occupied Housing Units	931	870	61	7.01%	1002	1253	-251	-20.03%
Vacant Housing Units	94	155	-61	-39.35%	320	212	108	50.94%
Homeowner Vacancy Rate	2.9	3.6	-0.7	-19.44%	4.8	2.5	2.3	92.00%
Rental Vacancy Rate	3.8	4.5	-0.7	-15.56%	12.1	6.1	6	98.36%

	2010	2000			2010	2000		
Census Tract	30.02	7 & 8			Study Area (Aggregate)			
			Change	% Change			Change	% Change
Data Source	2010 Census	2000 Census			2010	2000		
Total Housing Units	710	772	-62	-8.03%	3057	3262	-205	-6.28%
Occupied Housing Units	596	672	-76	-11.31%	2529	2795	-266	-9.52%
Vacant Housing Units	114	100	14	14.00%	528	467	61	13.06%
Homeowner Vacancy Rate	2.5	4	-1.5	-37.50%	3.40	3.37	0.03	0.99%
Rental Vacancy Rate	4.1	8.7	-4.6	-52.87%	6.67	6.43	0.23	3.63%

Figure 25: Housing Units and Tenure in Census Tracts, Aggregate Study Area and City of Wilmington in 2000 and 2010 (Sources - US Census 2000, 2010)

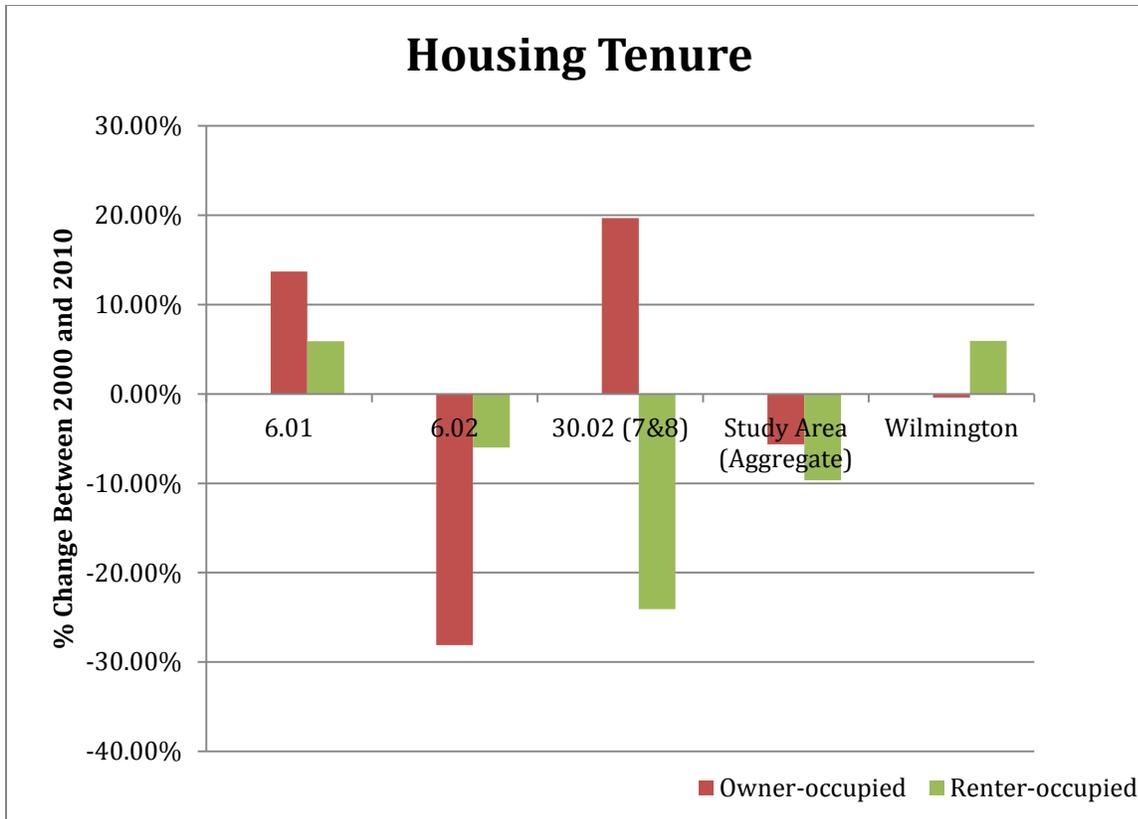


Figure 26: Percent Change in Housing Tenure in Census Tracts, Aggregate Study Area and City of Wilmington in 2000 and 2010 (Sources - 2000 and 2010 US Census)

While homeowner and rental vacancy rates also decreased in census tract 30.02 (37.5% and 52.87%, respectively), both of these rates increased dramatically in census tract 6.02 (92% and 98.36%, respectively).

Rates of owner-occupied housing increased in census tracts 6.01 and 30.02, but were offset by the 28% decrease in tract 6.02, resulting in an overall decrease for the aggregate study area. Rates of renter-occupied housing also increased in census tract 6.01, but declined throughout the other tracts and in the aggregate study area.

As the following figure illustrates, housing values increased from 2000 through 2010 in the City of Wilmington in general and in Northeast Wilmington. Each of the census tracts experienced decreases in housing valued below \$99,999, and each of the census tracts experienced increases in housing valued above \$100,000. Subsequent graphs depict increases (by count)¹⁶ of housing values within each census tract, the aggregate study area, and the City.

¹⁶ Because there were zero units in many categories of housing values within specific census tracts, changes are depicted by count versus percentages in these graphs.

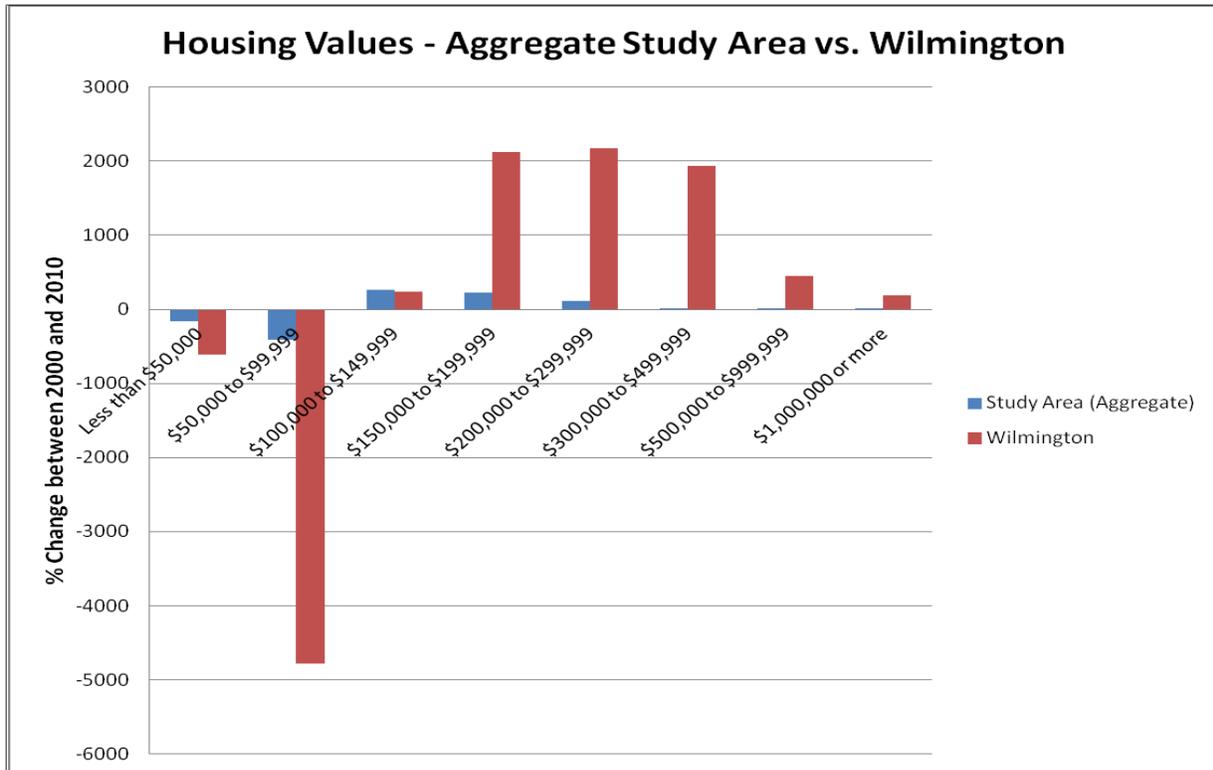


Figure 27: Percent Change in Housing Values in Aggregate Study Area and City of Wilmington between 2000 and 2010 (Sources - US Census, 2000, 2010)

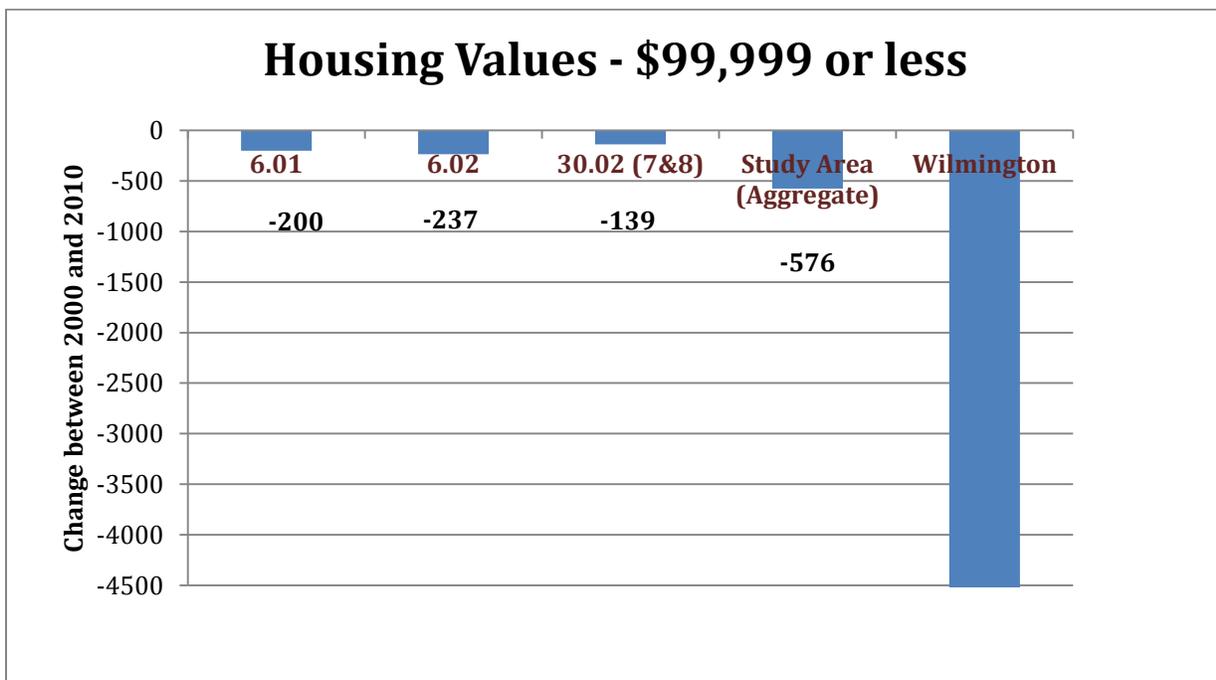


Figure 28: Change in Number of Housing Units with Value of \$99,000 or Less in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010 (Sources - US Census, 2000, 2010). Note: The city of Wilmington experienced a decrease of 5,398 houses at this value during the decade.

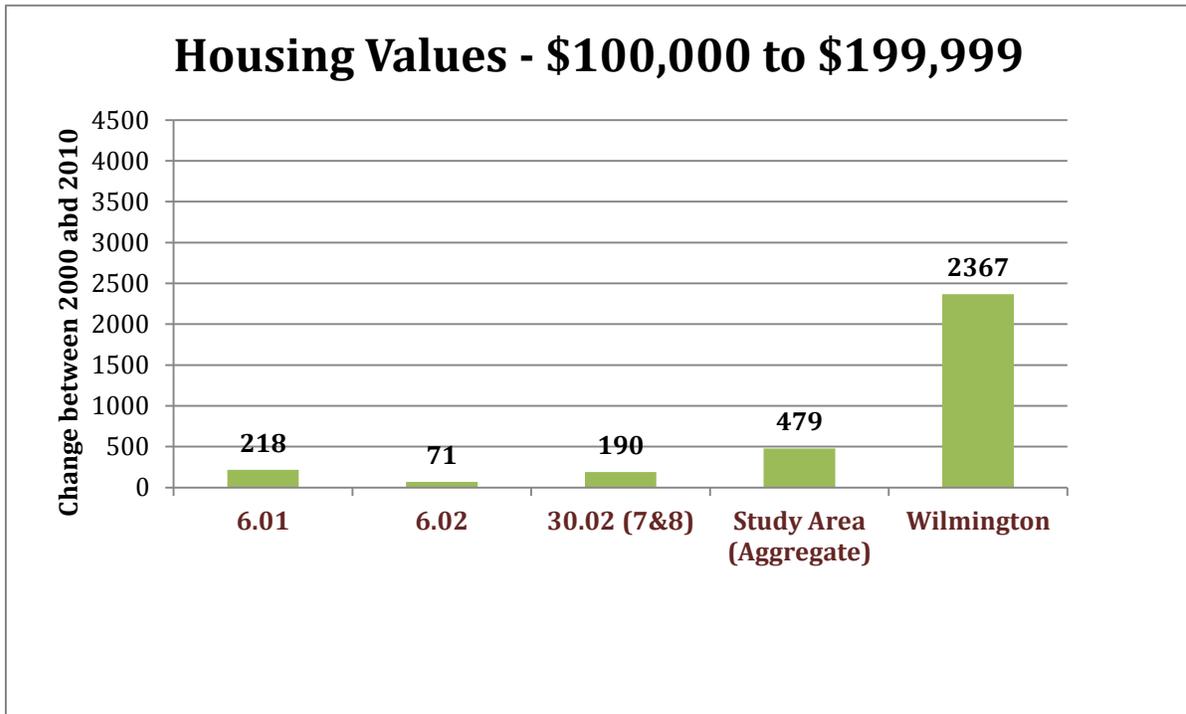


Figure 29: Change in Number of Housing Units with Value of \$100,000 to \$199,999 in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000-2010 (Source -US Census 2000, 2010)

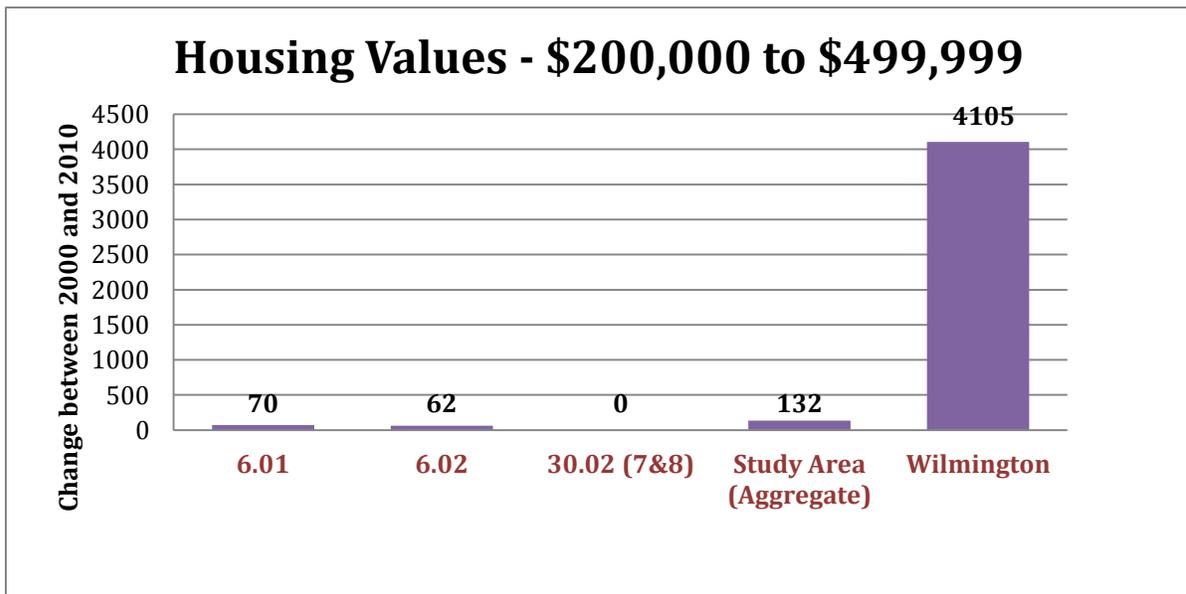


Figure 30: Change in Number of Housing Units with Value of \$200,000 to \$499,999 in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010 (Sources - US Census 2000, 2010)

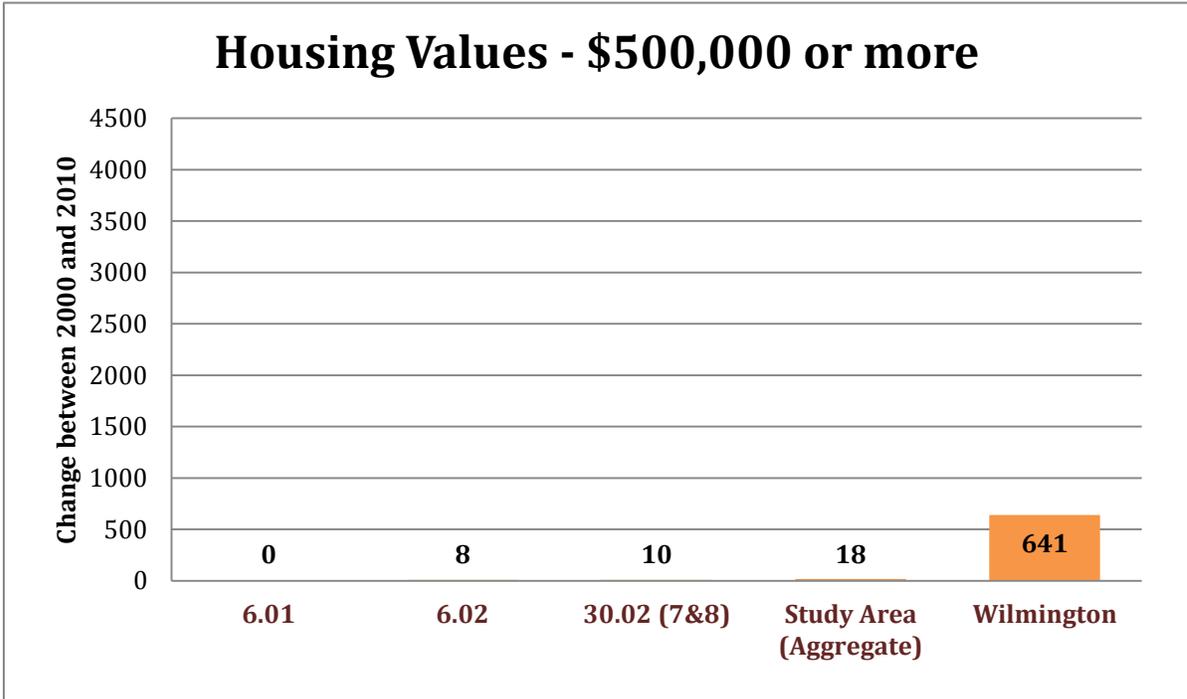


Figure 31: Change in Number of Housing Units with Value of \$500,000 or more in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010 (Sources - US Census 2000, 2010)

Employment

As the following chart indicates, there was a decrease in the number of residents in Northeast Wilmington in the civilian labor force as well as those not in the civilian labor force. Census tract 6.01 was the exception, where there was an increase of 20% in the number of residents in the labor force and a negligible change in residents not in the

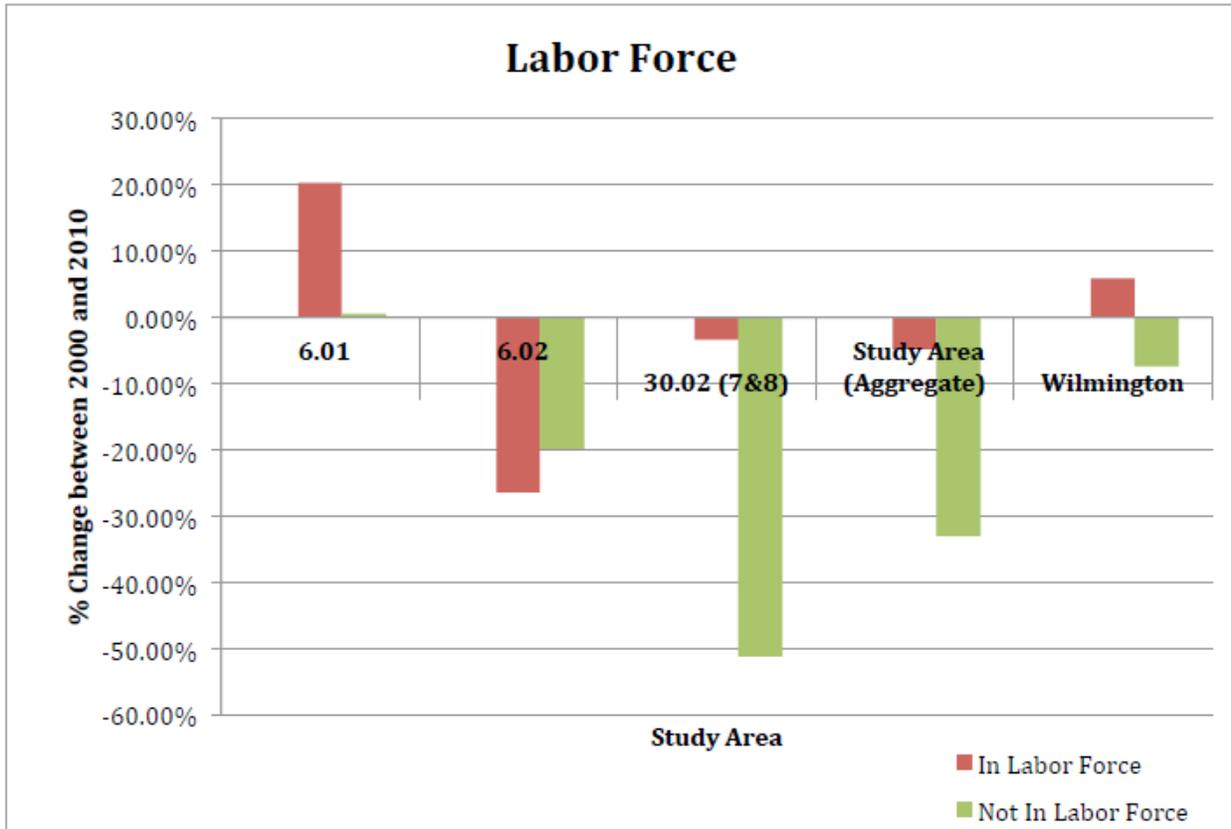


Figure 32: Percent Change in Labor Force in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010 (Sources - 2010 US Census and ACS 5YR Estimates 2006-2010)

labor force.¹⁷ Census tract 6.02 experienced the greatest decrease in the number of community members in the labor force (26%).

¹⁷ According to the US Census Bureau: “**Labor Force**” includes all people classified in the civilian labor force plus members of the U.S. Armed Forces (people on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard). “**Not in Labor Force**” includes all people 16 years old and over who are not classified as members of the labor force. This category consists mainly of students, homemakers, retired workers, seasonal workers interviewed in an off season who were not looking for work, institutionalized people, and people doing only incidental unpaid family work (less than 15 hours during the reference week). “**Employed**” includes all civilians 16 years old and over who either (1) were “at work,” or (2) were “with a job but not at work,” (i.e. temporary absence due to illness, vacation, etc.) “**Unemployed**” includes all civilians 16 years old and over who (1) were neither “at work” nor “with a job but not at work” during the reference week, and (2) were actively looking for work during the last 4 weeks, and (3) were available to start a job. Also included as unemployed are civilians who did not work at all during the reference week, were waiting to be called back to a job from which they had been laid off, and were available for work except for temporary illness. (2012. Retrieved from: http://www.census.gov/people/laborforce/about/acs_employ.html.)

From 2000 through 2010, there was a 9% decrease in the number of residents employed throughout the aggregate study area and an increase of 17% in the number of residents unemployed. Census tract 6.01 experienced a 22% increase in the number of residents employed as well as a 7.4% increase in the number of residents unemployed. Census tract 30.02 appears to have the most favorable indicators; it experienced an increase of 4.9% in employment and a decrease of 22.7% in unemployment. However, these positive indicators were offset by the nearly 40% decrease in the number of residents employed that occurred in census tract 6.02, which also experienced an 83% increase in the number of residents unemployed.

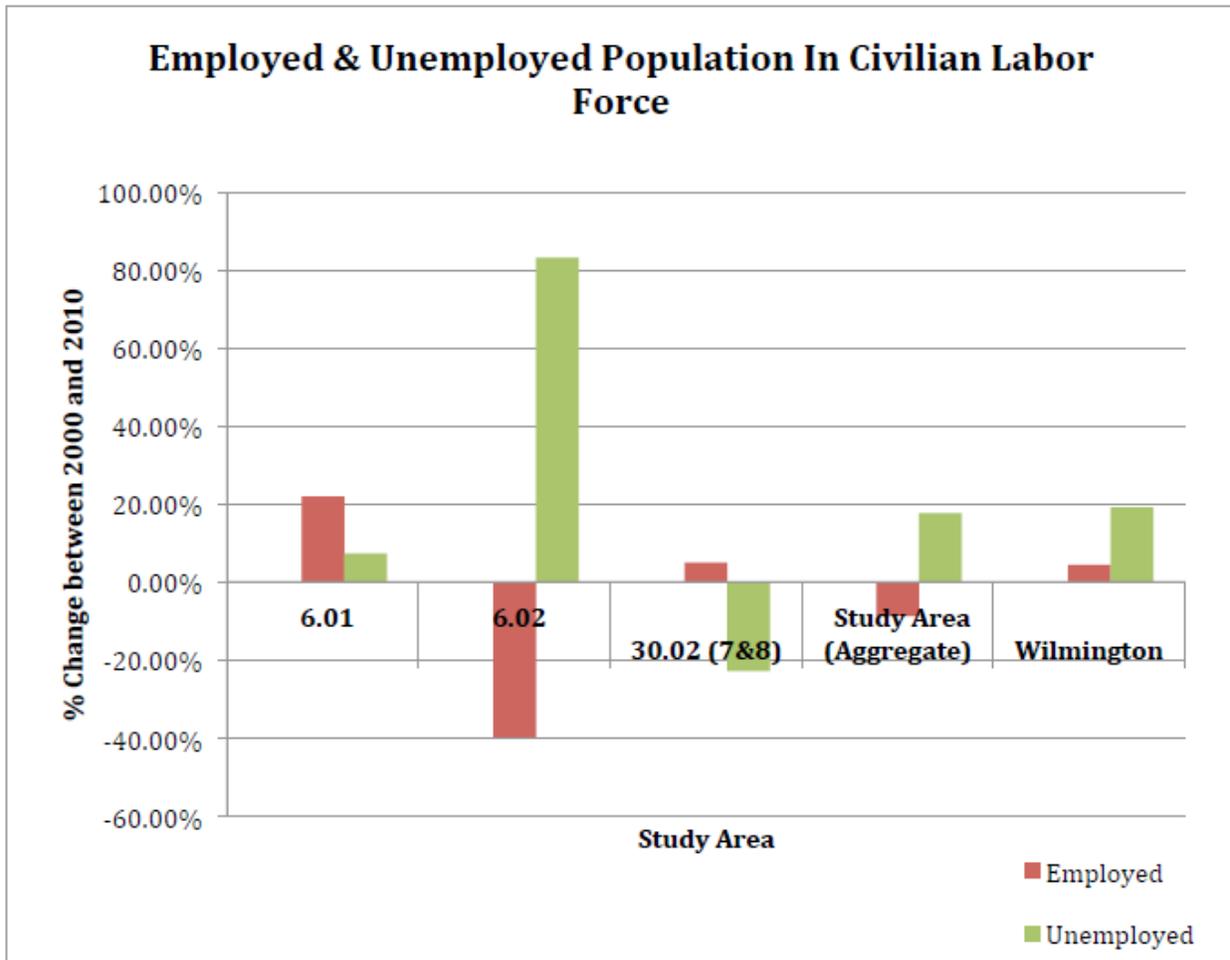


Figure 33: Percent Change in Employed and Unemployed Persons in Civilian Labor Force in Census Tracts, Aggregate Study Area and the City of Wilmington between 2000 and 2010 (Sources - 2000 US Census, ACS 5YR Estimates 2006-2010)

Health and Safety

Crime

As the next series of charts suggest, it is difficult to observe patterns in the study area for violent crime and drug crime activity for both the City of Wilmington and the

aggregate study area. However, there has been an overall gradual increase in the number of violent crime complaints filed since 2003 in both jurisdictions, as well as an overall increase of arrests.

In terms of individual census tracts, there has been a general trend of increases in violent crimes complaints in census tract 6.01, while there has been a general decline in the number of arrests from 2000 through 2010. Census tract 6.02 has experienced an erratic but overall increasing trend of complaints while experiencing a general decline in arrests. During that same time frame, census tract 30.02 has experienced a gradual increase in complaints and decrease in arrests.

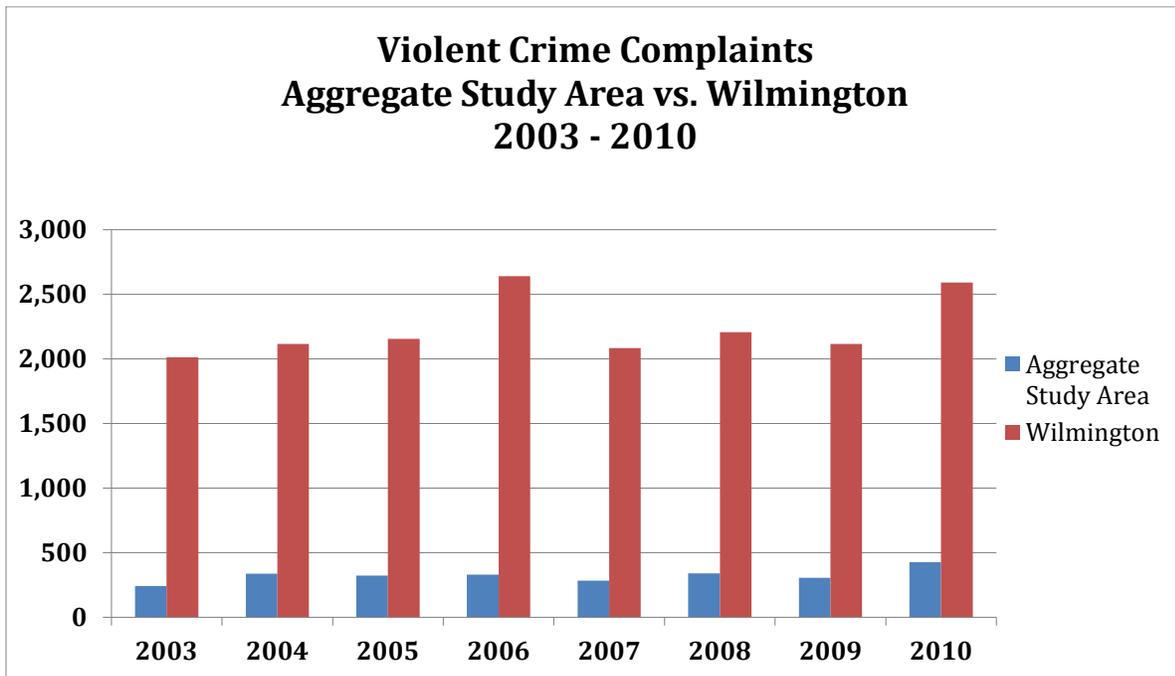


Figure 34: Comparison of Violent Crime Complaints in Aggregate Study Area and the City of Wilmington from 2003 to 2010 (Source - Statistical Analysis Center)

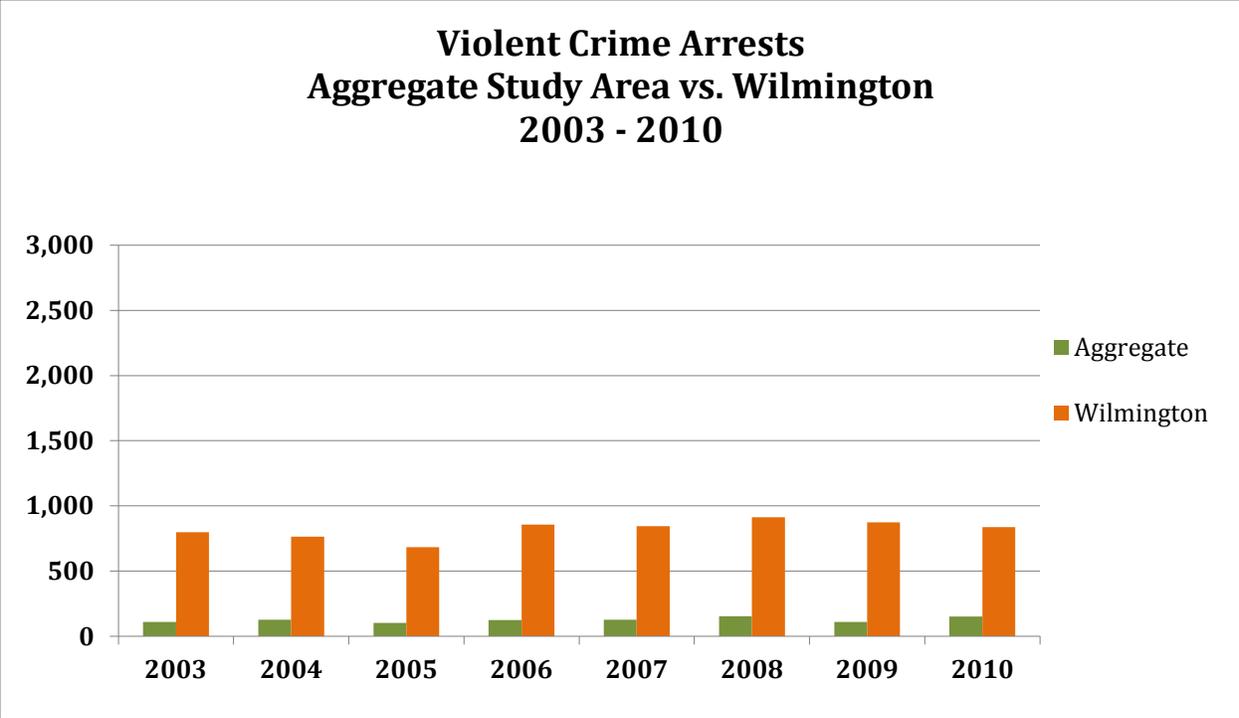


Figure 35: Comparison of Violent Crime Arrests in Aggregate Study Area and the City of Wilmington from 2003 to 2010 (Source - Statistical Analysis Center)

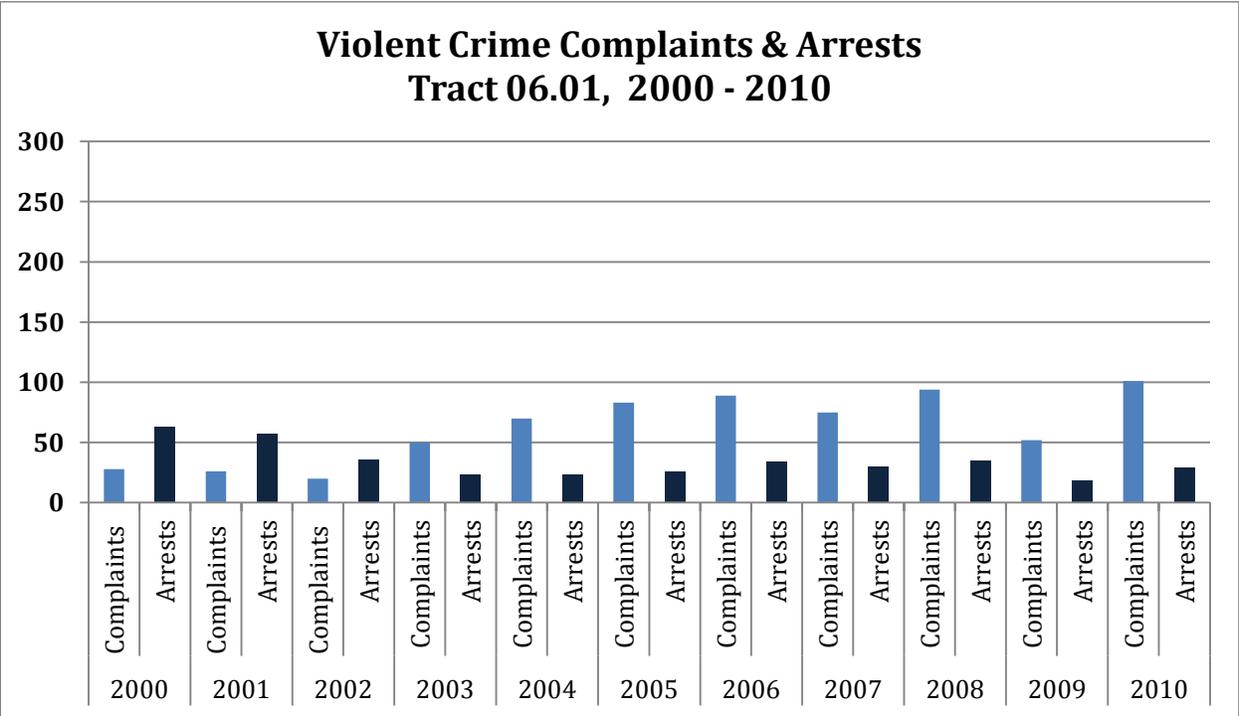


Figure 36: Violent Crime Complaints & Arrests in Census Tract 6.01 from 2000 to 2010 (Source - Statistical Analysis Center)

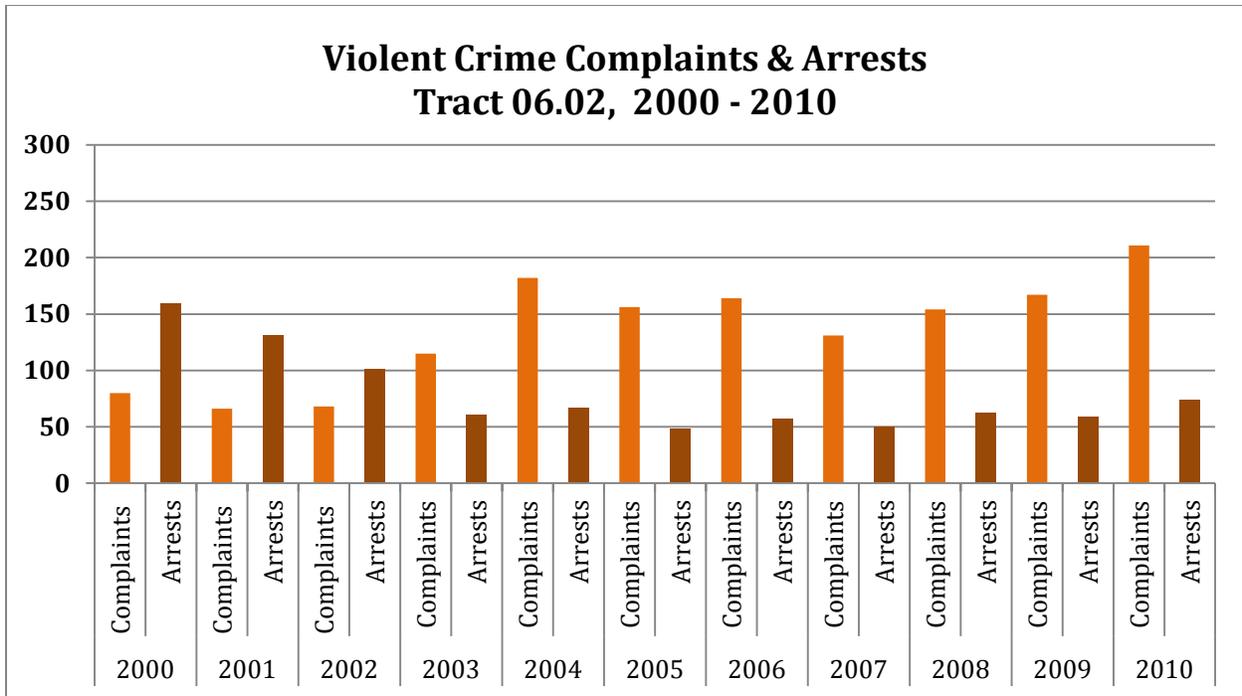


Figure 37: Violent Crime Complaints & Arrests in Census Tract 6.02 from 2000 to 2010 (Source - Statistical Analysis Center)

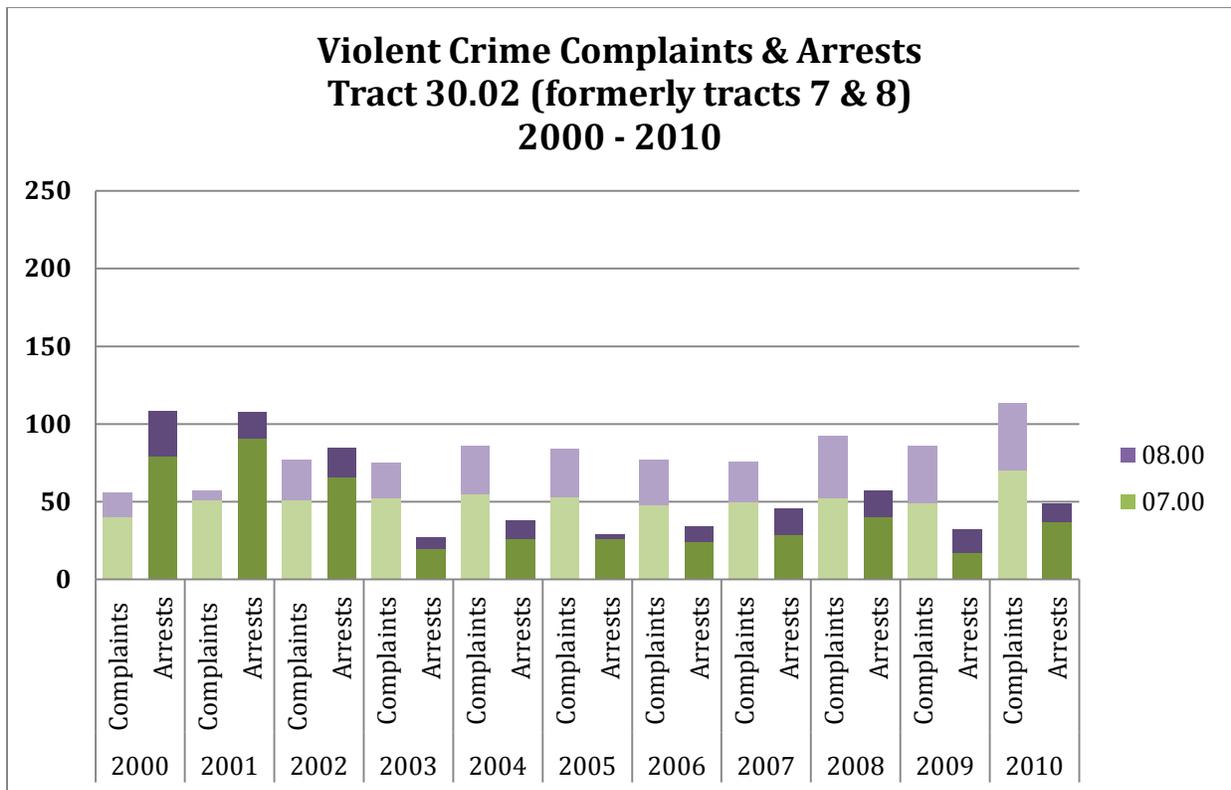


Figure 38: Violent Crime Complaints & Arrests in Census Tract 30.02 from 2000 to 2010 (Source - Statistical Analysis Center)

The following series of charts depict trends in drug-related crime. Though there has been an up-and-down trend, overall, drug-related crime complaints have declined from 2003 through 2010 in both the City of Wilmington and the aggregate study area. Arrests have followed a similar pattern but have also declined in both jurisdictions. Unlike violent crime, arrests typically outpace complaints.

Census tracts 6.01 and 6.02 experienced an up-and-down trend in both complaints and arrests. Census tract 6.01 (which experienced a much lower number of both complaints and arrests than either of the other two tracts) experienced an overall decline in both. However, census tract 6.02 experienced an overall uptick in both (though complaints and arrests were down in 2010 following a spike in 2009). Census tract 30.02 experienced great volatility in the occurrence of both complaints and arrests from year to year.

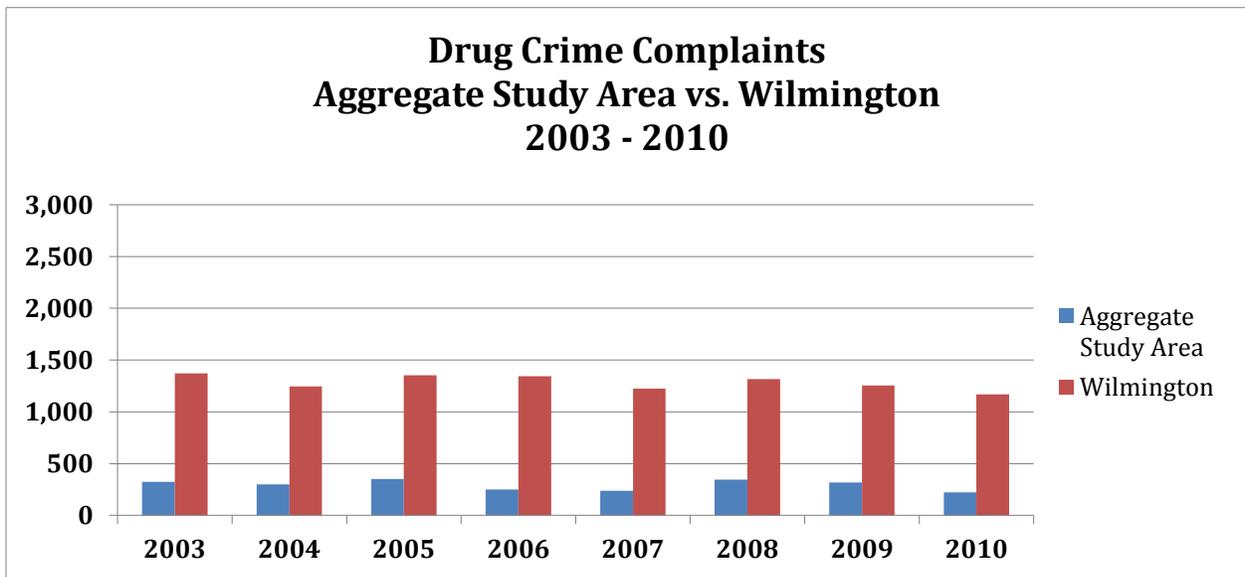


Figure 39: Drug Crime Complaints in Aggregate Study Area and the City of Wilmington from 2003 to 2010 (Source - Statistical Analysis Center)

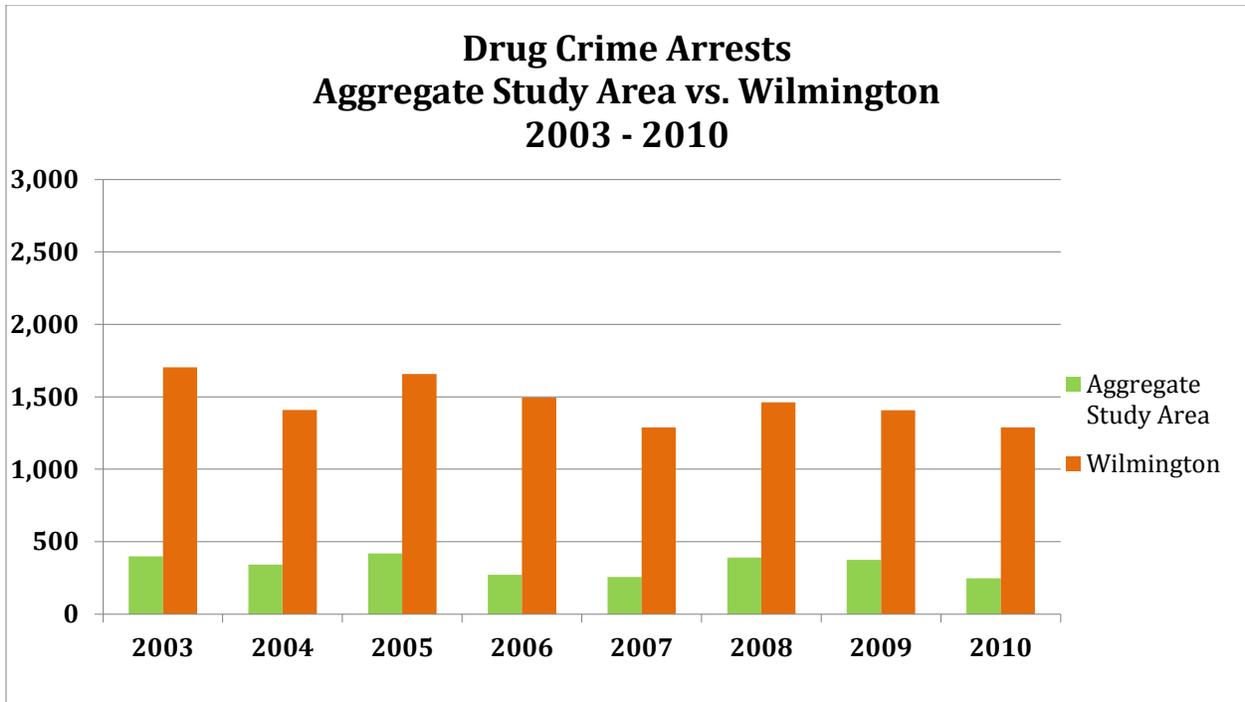


Figure 40: Drug Crime Arrests in Aggregate Study Area and the City of Wilmington from 2003 to 2010 (Source - Statistical Analysis Center)

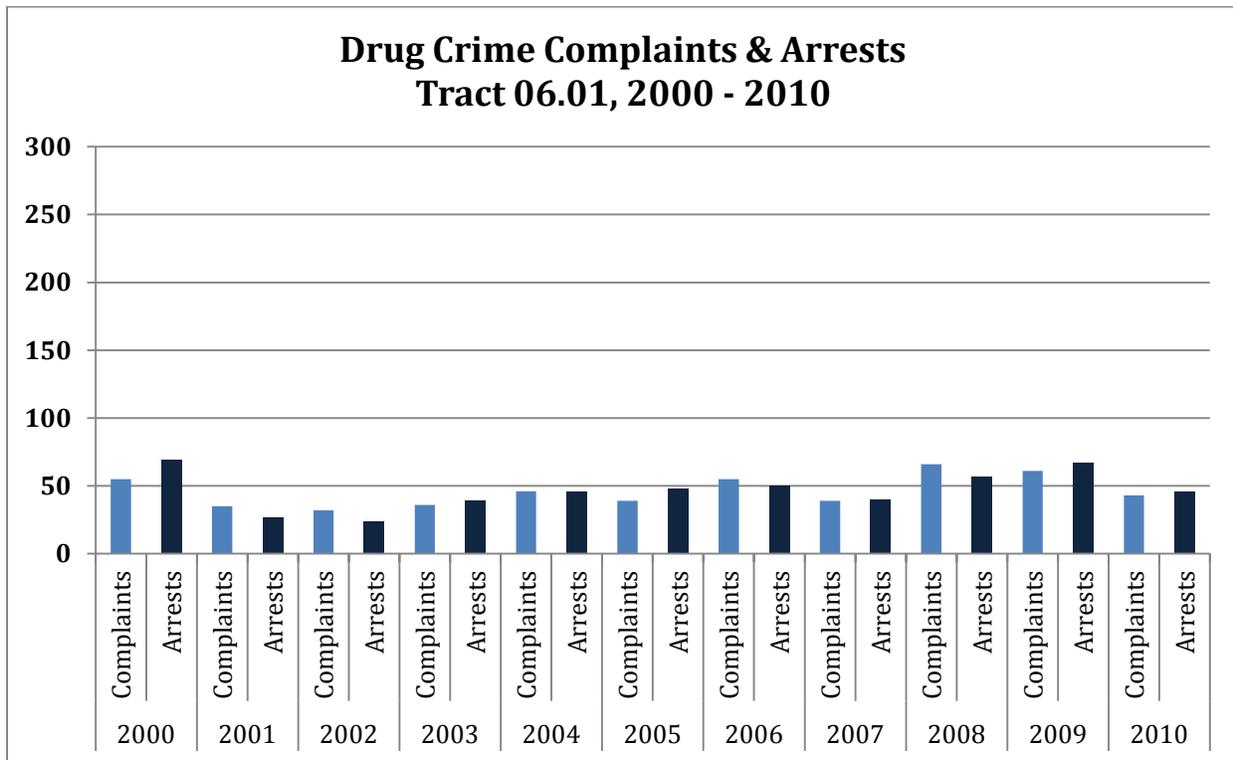


Figure 41: Drug Crime Complaints & Arrests in Census Tract 6.01 from 2000 to 2010 (Source Statistical Analysis Center)

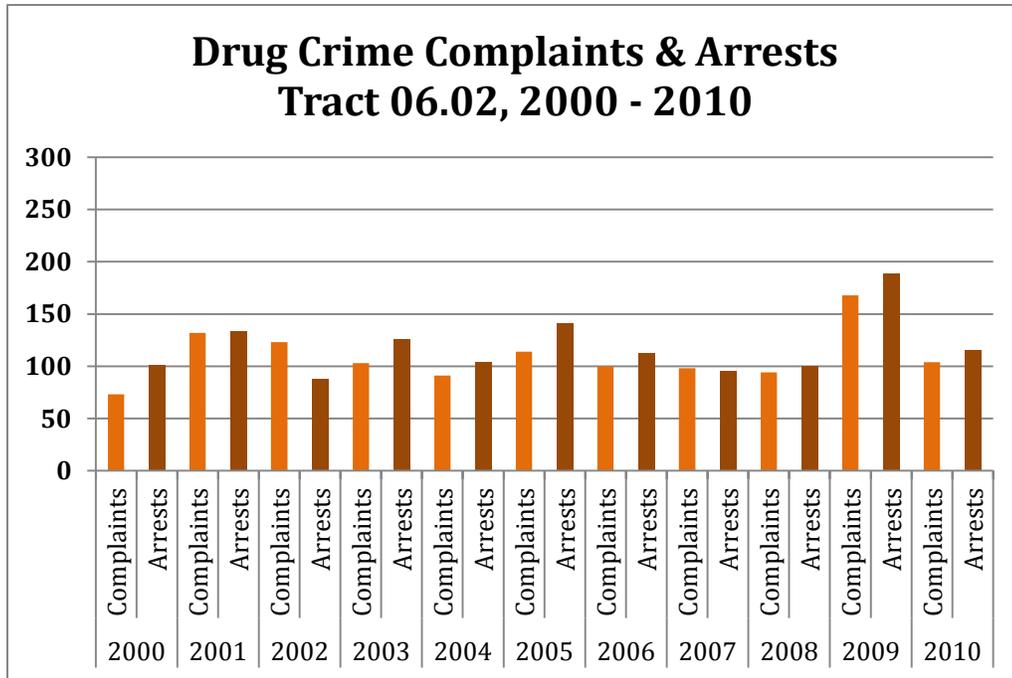


Figure 42: Drug Crime Complaints & Arrests in Census Tract 6.02 from 2000 to 2010 (Source - Statistical Analysis Center)

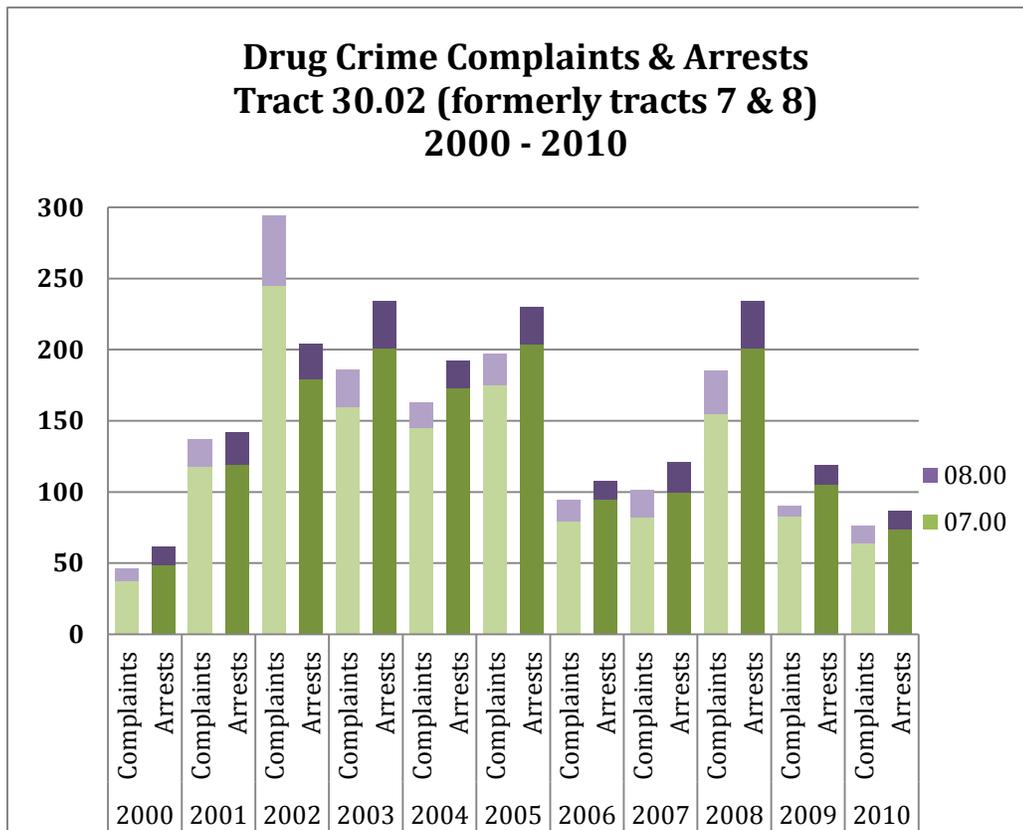


Figure 43: Drug Crime Complaints & Arrests in Census Tract 30.02 from 2000 to 2010 (Source - Statistical Analysis Center)

Health Indicators

Several health indicators are commonly used to consider changes in environmental impact: low birth weight, infant mortality, and congenital anomalies, as well as cancer death rates among adults aged 45 and older. The following tables indicates the following changes between the years 2000-2004 and 2005-2009: approximately 10% increase in low birth weight, a 25% decrease in infant mortality; a 233% increase in congenital anomalies (from 3 to 7); and a negligible change in deaths related to cancer.

Low Birth Weight

Years	6.01	6.02	30.02	Total
2000-2004	33	48	53	134
2005-2009	43	54	51	148
Total	76	102	104	282

Infant Mortality

Years	6.01	6.02	30.02	Total
2000-2004	1	9	6	16
2005-2009	3	4	5	12
Total	4	13	11	28

Congenital Anomalies

Years	6.01	6.02	30.02	Total
2000-2004	2	0	1	3
2005-2009	3	2	2	7
Total	5	2	3	10

Cancer Deaths, Age 45 and Older

Years	6.01	6.02	30.02	Total
2000-2004	33	39	7	79
2005-2009	26	35	14	75
Total	59	74	21	154

Figure 44: Health Indicators - Low Birth Weight, Infant Mortality, Congenital Anomalies, Cancer Deaths (Source - Delaware Department of Public Health, Health Statistics Center)

Licensing and Inspection

Licensing and Inspection reports are generated for a number of complaints, including the presence of fecal matter, high grass and weeds, improper placement of cans, improperly disposed of trash, and junk and debris. Such complaints can serve as indicators regarding aesthetics within a community. Data was obtained for the aggregate study area and the City of Wilmington for the years 2007 through 2011. The following tables indicate that complaints regarding fecal matter were relatively few in the aggregate study area. Complaints regarding high grass and weeds continued to rise throughout 2011. Improperly disposed of trash complaints have almost doubled since 2007. Complaints regarding junk

and debris appeared to crest in 2009, though there was an uptick in 2011. Over time, complaints in all categories have risen in the City of Wilmington as well.

	Study Area (Aggregate)				
	2007	2008	2009	2010	2011
Fecal Matter	6	11	3	16	16
High Grass and Weeds	236	372	435	487	499
Improper Placement of Trash Cans	9	11	35	30	31
Improperly Disposed Trash	171	274	304	267	322
Junk and Debris	346	480	503	330	403

	Wilmington				
	2007	2008	2009	2010	2011
Fecal Matter	45	126	95	81	81
High Grass and Weeds	1156	2736	2769	2597	2613
Improper Placement of Trash Cans	189	411	256	185	183
Improperly Disposed Trash	1003	2318	1834	1388	1435
Junk and Debris	1321	3233	2487	2076	1978

Figure 45: Licensing and Inspection Complaints in Aggregate Study Area and the City of Wilmington from 2007 to 2011 (Source - City of Wilmington, Department of Licenses and Inspections)

Information Provided by Key Informants and Through Additional Sources

In this study, researchers obtained additional insights from key informants who were actively engaged in, and knowledgeable of, community development in Northeast Wilmington. Forty-three potential key informants were invited via email or telephone to participate in semi-structured interviews. City and county employees, civic association leaders and neighborhood planning council representatives for Northeast Wilmington, elected officials representing jurisdictions within the study area, representatives of other community organizations, and environmental consultants were among those invited. Follow-up emails and/or telephone calls were made to those who had not responded to the initial request. In all, 18 informants participated in telephone interviews lasting between 45 and 75 minutes. The sample included seven BDP developers (six affiliated with nonprofits, and one private developer); six community representatives/advocates; four government officials; and one other.

The interviews were designed to elicit feedback on: awareness and perception of the BDP and brownfield activity in the study region (awareness of the program specifically as well as individual development projects, expectations relevant to the brownfield development, and community engagement relevant to these projects); changes observed in the study area throughout the past decade that were perceived to be related to the brownfield

development in the region; and recommendations for the BDP and for evaluating its impact. The following themes emerged as a result of these interviews.

Knowledge and Perceptions of BDP and Brownfield Development in Northeast Wilmington

Reasons for Developing State-Certified Brownfields

There was a wide range of awareness of the BDP and its processes. Not surprisingly, government representatives and developers who had worked directly with the program were highly aware of the program and its policies and procedures. Community advocates who were not BDP developers often did not realize that specific development projects were brownfield development projects. However, once they were informed which projects were state-certified brownfields, most participants were quite familiar with individual initiatives. Speakman Townhomes, Habitat for Humanity sites, McMullen Square, Wiley Cork Factory, and Diamond Salvage were the most recognizable projects. The community garden/urban farm at 12th and Brandywine, which had not been remediated through the BDP, was also highly recognized. Occasionally, participants thought that other initiatives, such as the Job Corps site, were part of the BDP.

Reasons for participation in the BDP varied. For many nonprofit BDP developers, the choice was driven by a desire to fulfill social justice missions by delivering services to a disadvantaged area while reducing urban blight and enhancing the physical setting. Several participants mentioned the desire to thwart illegal and illicit activity taking place on abandoned properties. Some developers had actively sought brownfields for redevelopment, in part based on environmental concerns but also due to the positive reputation of the Delaware BDP. Finally, location and market needs were noted as primary factors for site selection and, when it was subsequently discovered that remediation was required, developers applied for funding through the BDP. In most cases, there was a deliberate effort to generate community revitalization (through such goods and services as safe and affordable housing, youth- and education-based activities, and social services) while eliminating an environmental risk. Developers had learned of the BDP through multiple channels: directly through DNREC; environmental conferences and other environmental resources; community meetings; real estate networks; and by “word of mouth.”

Community Response to Brownfield Initiatives and Involvement in the Process

Developers felt it was their responsibility (rather than that of the BDP program) to conduct outreach, and often conducted many preliminary discussions with community civic and business leaders who, in turn, facilitated more formalized outreach efforts.¹⁸ Civic associations, neighborhood planning councils, zoning meetings, and grassroots

¹⁸ The exception was the Speakman project, which was a major undertaking and anticipated to be potentially controversial. In this instance, the BDP project director initiated a public hearing to proactively engage the community at large and provide opportunity for questions and comments.

organizations were mechanisms to publically introduce and discuss proposals. Faith-based networks were also accessed, though one informant thought they could and should be more effectively utilized. Most non-developers interviewed reported that they learned of the initiatives through civic and community forums.

All participants perceived that community members were overwhelmingly in favor of the proposed projects because they believed they would beautify the area, decrease the opportunity for criminal and drug activity, and present an opportunity for something positive to be developed to benefit the community. According to participants, when concerns had been voiced, they were almost always related to the purpose of the development, the aesthetics, or the overall affordability of the project, not environmental concerns. Several noted that this was in contrast to the new Delmarva power sub-station under development in the study area, which has generated a great deal of public concern and opposition due to environmental concerns. BDP project managers shared this impression that local residents enthusiastically welcomed brownfield regeneration, and that relatively few environmental concerns had been raised in response to proposals. The limited newspaper coverage of brownfield development in Northeast Wilmington also indicates that community response was generally favorable.

Some participants speculated that the lack of community resistance to brownfield development might have been because environmental issues are removed from more immediate concerns faced by residents, such as employment, financial, and health care issues. Others speculated that because residents had previously been concerned with higher profile environmental issues, such as the nearby Cherry Island landfill, brownfields, if considered at all, were not deemed as serious a threat. Developers of affordable housing noted that prospective homeowners become well educated regarding environmental issues, including future restrictions and requirements, throughout the process of qualifying and purchasing a home, which may account for lack of apparent apprehension regarding the property's former status.

Furthermore, participants perceived that, left unattended, brownfield properties generated negative feelings among community members and posed hazards beyond environmental concerns. For example, the Wiley Cork factory had been considered not only a contaminated property and an eyesore but also a dangerous place that attracted neighborhood children; it was also the site of drug use, drug deals, and prostitution. Moreover, the abandoned factory was perceived by some as a symbol of how this part of the City had been "left behind" in the wake of progress taking place in other neighborhoods. The proposed remediation and development of these properties were welcomed as the means to redress multiple threats to the community.

Key informants also believed that brownfield development was viewed favorably by community members because of its potential to generate investment by other, non-brownfield developers in Northeast Wilmington. Most participants anticipated, and believed that residents anticipated, successful brownfield initiatives would attract welcomed retail services such as drugstores, grocery stores, restaurants, and banks. BDP developers also believed that housing efforts like Speakman Place, the Habitat sites, and

McMullen Square would lure other housing developers to build as well.

In the only reference to gentrification or displacement to emerge throughout the discussions, one participant suggested that while homeowners were happy with proposed brownfield development, renters were sometimes wary.

In general, participants thought that adequate processes were in place to allow community members to learn of proposed brownfield development, remain informed, ask questions, and voice concerns. Beyond community meetings where proposals are laid out, the BDP public information officer canvasses the street or block in immediate proximity of brownfield development to inform residents of the imminent activity. Developers were aware, of course, of public notices at various points throughout the approval, investigation, and remediation processes; however, several participants raised concerns about residents being aware of the public notices.

Because the plans were typically met with enthusiasm, relatively little resistance to specific projects was reported by participants. However, in one instance some residents had voiced a desire for greenspace rather than the proposed housing, but the developer proceeded once zoning and other permissions were approved. In the same instance there were also some minor concerns regarding aesthetics; in response, the developer made a minor “cosmetic” modification to the design. At that time, some community members were also concerned that development would exacerbate flooding – an existing problem during periods of heavy rain throughout the area. Key informants and BDP project managers reported that DNREC responded to the satisfaction of community members whenever questions had been posed during the course of development projects.

However, despite community-based meetings and multiple opportunities to participate in public dialog regarding proposed brownfield development, a number of key informants believe that relatively few community members are actively involved in the process. Once again, several participants suggested this was due to the presence of more immediate concerns taking precedence. Others reiterated the need to exploit additional avenues for engagement, notably faith-based organizational networks and social media. Several participants expressed concern that public notices in the newspaper may be insufficient for soliciting formal feedback from local residents on proposed brownfield development. One key informant indicated that although there are multiple opportunities for discourse, there is a need for transliteration between the technical experts and community members.

Changes in Northeast Wilmington Perceived to Be Related to Brownfield Development

Housing and Community Pride/Civic Engagement

The most significant change in Northeast Wilmington that all participants linked to brownfield regeneration was the increase in safe and affordable housing. Increased home ownership, and a decline in absentee landlord-owned rental properties, was considered the key to community stabilization and revitalization. In addition to the

removal of blighted properties that paved the way for more attractive housing, and an increase in the local tax base, many key informants felt that a valuable byproduct to BDP development was a sense of community engagement that accompanied specific projects. For example, Habitat for Humanity invests heavily in community engagement to generate support for proposed projects, and provides a great deal of information during all phases of development. The organization conducts public events such as groundbreaking and ribbon-cutting ceremonies. Key informants perceived a sense of enthusiasm among community members in response to these highly visible initiatives. They offer the following anecdotal evidence of increased community engagement:

- A heightened investment in beautifying home exteriors, not only in the new developments but neighboring areas
- A new civic association formed by the homeowners of Speakman Place
- A decrease in illegal dumping, in part due to vigilance of community members willing to make reports to licensing and inspection
- An increase in attendance at civic association meetings and other community events, such as the Toys for Tots drive and annual City Clean-Up days
- An increase in police participation at civic association meetings, which result in more citizens reporting suspected crime, and a more timely response to reports by law enforcement
- Increased community interaction by tending to the urban garden

Key informants also linked new housing initiatives to improved community aesthetics related to the fresh development as well as community members' efforts to improve and maintain their properties and report illegal dumping and other crimes.

However, not all participants noted increased community engagement. Several community advocates reported that despite increased outreach efforts on the part of many community organizers, a significant percentage of citizens continue to feel hopeless and unengaged. These participants cited financial hardships related to broader economic pressures, joblessness and inadequate job training, the presence of drug-related and violent crimes in the community, a lack of affordable health care, a lack of resources for youths, and other stressors as barriers to engagement.

Neighborhood Economy and Infrastructure

Key informants thought that certain changes in the availability of goods and services to residents in Northeast Wilmington might have been partially attributable to brownfield development. Although these businesses were not on the sites of remediated and developed brownfield properties, ***there was a sense that the rehabilitation of contaminated properties and the influx of new residents due to housing opportunities had the spillover effect of attracting such investment.*** In particular, the opening of a new Food Lion grocery store on Northeast Boulevard was considered a boon to community members who previously did not have convenient access to quality and reasonably priced groceries. Several participants also noted the popularity of the community garden at 12th and Brandywine and other urban farming efforts as indicators of progress related to

brownfield remediation. The availability of these commodities also has implications for potentially improving health behaviors.

Key informants pointed out other new resources and commodities as indicators related to the success of brownfield activity and its spillover effect, such as:

- An increase in the number of faith-based organizations in Northeast Wilmington
- The emergence of two new charter schools (Prestige Academy Charter School, which opened in 2008, and the new Maurice J. Moyer Academy, a school that had opened in 2006 and lost its charter in 2010, but reopened later that year in response to community support)
- The recently developed Prestwyck Townhomes
- The opening of a satellite office of Westside Family Healthcare
- The opening of Family Dollar and other new businesses on Northeast Boulevard/Governor Printz Boulevard

Health and Safety

As previously mentioned, many participants thought that brownfield regeneration was directly linked to several positive health and safety outcomes:

- Remediated sites no longer pose an active threat of environmental contamination to community members;
- The rehabilitation or demolition of unsafe, abandoned structures reduce the risk of neighborhood children playing in physically hazardous surroundings;
- The rehabilitation or demolition of abandoned, contaminated properties reduce the availability of locations for criminal and drug-related activity, vandalism, and illegal dumping.

In addition, the interest in community gardening provides residents with affordable access to fresh produce while the creation and/or cleanup of greenspaces may lead to an increase in physical exercise. Participants also thought that an increase in civic engagement might have been linked to an increase in reports of suspected crime – in other words, people being invested enough to take action – and greater responsiveness by local law enforcement leading to a greater sense of safety.

Community Leadership

One key informant, a nonprofit community developer, shared an insight he perceived regarding the intangible benefits of brownfield regeneration associated with community leadership. The participant was a representative of an organization that demolished an unsafe, abandoned, and blighted building that was the former site of crime, vandalism, and other neighborhood disturbances. By eliminating this threat, this participant believed the organization's leaders earned greater respect, credibility, and influence, which have proven very beneficial as they have undertaken other community endeavors.

Additional Thoughts Regarding the Impact of Brownfield Activity in Northeast Wilmington

All but one participant verbalized the perception that social conditions overall were improving in Northeast Wilmington but that change was slow. Brownfield development was considered an important factor in these changes, but not the only factor. The following changes were observed as having additional positive impact on the community:

- Notable changes in the physical landscape – beautification efforts and enhanced street lighting along Market Street; infrastructure improvement on Northeast Boulevard/Governor Printz Boulevard, including a more appealing entrance into the City; bus shelters; traffic cameras; etc.
- New businesses moving back onto Northeast Boulevard/Governor Printz Boulevard (Food Lion, roofing business, automotive places, Family Dollar)
- Development of the Village of Eastlake (owner and rental units)
- Prestwyck Town Homes (private development)
- Sustained presence of charter schools (including the new Moyer Academy, Prestige Academy)
- Youth programs and environmental projects launched by the Delaware Center for Horticulture
- Enhanced presence of community organizations, faith-based organizations, and nonprofits such as PAL, the Greater Brandywine Village Revitalization, Inc., Job Corps, Inc., New Destiny Fellowship, Habitat for Humanity, Inc., Westside Healthcare Clinic, etc.
- Development of urban garden, urban farmer's market
- Weed and Seed crime prevention program
- State Attorney General initiatives to address irresponsible absentee landlords
- Enhancements to License and Inspection reporting
- City Clean-Up Day
- Weatherization program
- Foodbank/Angel Food Ministries
- Delmarva Power substation under development
- Blueprint Communities
- Limited funding for capital improvement available through neighborhood planning council
- Friends of Historic Riverview Cemetery (caring for the graveyard)

There were also several contradictory observations about changes that had taken place in Northeast Wilmington since the inception of the BDP. For example, some participants believed there had been a decline in open-air drug trafficking in the past decade while others felt the situation had become worse. Several key informants noted that despite improvements, this area continued to experience high rates of poverty. While some participants indicated that attendance at civic association and community meetings was more robust, others had not observed a difference. Three of the community advocates reported that there was a sense of hopelessness among many residents, and that the positive impacts were too few and far between.

In general, key informants thought that it was very difficult to gauge what degree of change was related to brownfield activity versus other factors. Several participants suggested conducting a survey to elicit perceptions of community members regarding what changes they had observed, and which impacts were attributable to brownfield regeneration.

By and large, participants indicated that the widespread economic downturn experienced throughout the US in recent years had limited brownfield development in Northeast Wilmington, and thus limited the BDP's potential impact to improve social conditions. For example, several projects (such as Diamond State Salvage, Riverside Development, and Kappa Mainstream, Inc.) have been significantly delayed as developers continue to seek funding necessary to complete construction post remediation. Difficulty obtaining mortgage lending has stymied development at McMullen Square where units are built as they are sold (a common practice).

Key Informant Perceptions of the Delaware Brownfields Development Program

Finally, participants were asked to provide feedback on the BDP and how it functions. The program received very favorable feedback from all who were directly involved in brownfield development in Northeast Wilmington. It was viewed as a program staffed by knowledgeable, efficient, effective, and responsive professionals and administrators. Of particular note, all seven of the BDP developers who were interviewed would like to work with the program on future development projects when and if opportunities and needs arise.

Perceived Strengths of the Delaware Brownfields Development Program

Based on their experience (including non-developers who were heavily involved in community initiatives), key informants described the following perceived strengths of the Delaware BDP:

- The availability of funding for investigation and remediation as well as the release from liability is paramount to brownfield regeneration.
- Despite its complexity, the process (application through completion) was considered straightforward and seamless, even during periods of state government administrative transitions. It was also relatively simple to obtain state-certified brownfield status.
- BDP staff and administrators were viewed as highly committed to their mission and "real partners," which was not always experienced when working with government agencies.
- Timeliness in responding to various action plans and to requests for reimbursement were particularly beneficial to nonprofit developers.

- Positive working relationships with other entities engaged in the process, (including environmental consultants and various state, city, and county departments) promoted efficiency.
- The BDP was viewed as effective in bringing prospective owner and developer to an agreement based upon the execution of investigation.
- The staff was highly regarded as knowledgeable; participants believed that they understood the science involved but also communicated this knowledge well. They were highly accessible and willing to participate in outreach efforts, respond to questions, and share their expertise. The Brownfield Advisory Committee was also seen as an asset.
- The BDP has a good reputation as a program that “does what it says it’s going to do.”
- SIRS/SIRB is viewed as pro-development.

Perceived Limitations of the Delaware Brownfields Development Program

The greatest limitation that most participants observed was that the BDP was not as visible as it could be and this limited its potential impact in terms of community revitalization. Many participants also voiced the desire for higher funding levels, particularly for nonprofit applicants. Several other perceived limitations were noted:

- Restrictions on what funds could cover limited the opportunity for brownfield development initiatives to serve to “educate” rather than simply “inform” community members about environmental issues (such as renewable energy, maintaining environmental safety, etc.).
- Although straightforward, there is a great deal of requisite paperwork that several participants thought could be streamlined. In particular, the legal review was viewed as a burdensome process relative to its function.
- One participant suggested that a property with marginal contamination might not require as many work plans as more compromised properties.¹⁹

Key Informant Recommendations for Program Improvement

Most recommendations offered were related to the theme of enhancing the visibility of the BDP, its potential as a resource for community development and revitalization, and its accomplishments through aggressive outreach efforts:

- Maintain an active presence within the community through continued attendance at civic association meetings, neighborhood planning commission meetings, and other

¹⁹ On a related note, a BDP staff member interviewed suggested that mandatory levels of intervention for brownfield remediation were “inherited” from Superfund policy, and reduced costs would be associated with modifying the requisite level of intervention for brownfields with lower levels of contamination.

public forums to foster open communication.

- Encourage DNREC to take a more proactive lead in promoting awareness of environmental issues in general, including brownfields.
- Sponsor informational sessions highlighting the program and its various development projects, and to discuss market-ready properties.
- Develop a simple brochure outlining the “who, what, where, when, how, and why,” of the Delaware BDP. In addition, a brief 5-10 year report or brochure highlighting the successful projects may encourage additional development, but also debunk the perception that poor communities are the only ones dealing with brownfields.
- Make a concerted effort to engage people directly in the process, and promote job training and employment opportunities related to brownfield development.
- Access faith-based organizations to promote awareness of environmental justice and the BDP.
- Utilize social media to promote awareness of environmental justice and the BDP.

However, one key informant disagreed with the recommendation to raise awareness of the BDP, noting that early efforts to conduct outreach regarding the program resulted in the inaccurate notion that there was a government program that would clean up all contaminated properties. The participant also noted that remediation costs exceed the grant award in many instances. This highlights the need for accurate and complete information, particularly regarding the responsibilities of the applicants, to be emphasized in any outreach effort to promote the program’s opportunities.

Other recommendations for program improvement included:

- Reviewing and streamlining the requisite paperwork.
- Evaluating the levels of intervention required for properties that were minimally contaminated.
- Reducing restrictions of how funding could be spent.

Discussion

There are two major questions to consider. First, does the data collected indicate that changes have occurred among social indicators throughout the study area? And, if so, do the changes appear to be associated with the brownfield development that has taken place?

Although the results are mixed, in synthesizing the quantitative and qualitative data, we are able to observe some emerging trends that may be attributable to brownfield regeneration in Northeast Wilmington. Many of these appear related to the creation of safe and affordable housing – the intended purpose of many brownfield initiatives in this community – and its spillover effects. Repeatedly, key informants focused on the need for newer housing, and the neighborhood stabilization that often accompanies such an investment. We also observed differences among indicators across the individual census

tracts. In general, the most positive trends were observed in census tract 6.01, the tract that experienced the greatest increase in safe and affordable housing through brownfield regeneration (Speakman Town Homes, McMullen Square, and Our Youth, Inc.).²⁰ It will be important to monitor for trends that may emerge as brownfield initiatives in census tracts 6.02 and 30.02 are completed.

In census tract 6.01, there was an increase in population of 7.6% between 2000 and 2010. This contrasts with population trends for the City of Wilmington as well as the other census tracts in the aggregate study area. Levels of educational attainment also improved the most in this area, with increases in the rate of residents achieving high school diplomas and some level of higher education, including bachelor degrees, graduate degrees, and professional degrees.

Changes in income levels in tract 6.01 were varied. There was a 26.8% increase in the percentage of households with incomes of \$14,999 and lower, and a 36.8% increase among individuals living below the poverty line. However, there were also increases in the percentage of households with higher income levels, including a 58% increase in households with incomes ranging between \$75,000 and \$149,999. In addition, the number of occupied housing units increased, while the number of vacant housing units decreased along with homeowner and rental vacancy rates. There was also a decline in the number of houses valued under \$99,999 in this tract (as well as in the other census tracts in Northeast Wilmington and the City) and an increase in houses valued above \$100,000. Census tract 6.01 also demonstrated a 20% increase in residents in the labor force and a 22% increase in the rate of employment, but also posted a 7.4% increase in the rate of unemployment. While many indicators demonstrate positive changes in neighborhood economy, there is also evidence of income disparity.

Changes in neighborhood economy indicators for census tracts 6.02 and 30.02 also present mixed results. Both tracts decreased in population, but like census tract 6.01 the ethnic make-up remained relatively stable. Both tracts demonstrated some positive trends in indicators of educational attainment; for example, there were decreases in both tracts among the rates of residents with no diploma and an increase among residents who had obtained some level of college education. Census tract 6.02 also demonstrated the highest rate of increase among residents with graduate or professional degrees. Negative trends included a decrease among residents who had achieved high school diplomas or bachelor degrees.

Among the negative indicators, like census tract 6.01, tract 6.02 experienced an increase in the rate of residents living below the poverty line (31%), though it also experienced a 30% decrease in the rates of households with annual incomes of less than \$14,999. The tract also experienced decreases in the rate of residents in the work force as well as those employed, and an 83% increase in the rate of unemployment. There were decreases in housing units, and increases in homeowner and vacancy rates. Housing values improved modestly in the area in line with the other census tracts in Northeast Wilmington.

²⁰ Interestingly, Census 2010 data indicates no change in total housing units for tract 6.01.

At the same time, census tract 30.02 demonstrated several positive trends, including a decline of 53.1% among the poorest residents and a 56.9% decline in households living on \$14,999 or less annually. Rates of employment also increased while rates of unemployment decreased. However, there were also decreases in total housing units, occupied housing units, and increases in homeowner and rental vacancy rates. There were modest improvements in housing values.

In analyzing health and safety indicators, census tract 6.01 appears to have experienced an overall trend of increased reports of violent crimes and a decline in arrests since 2000. This may be related to the perceptions shared by key informants who suggest that there is greater sense of civic pride generated by the new housing developments, leading to greater civic engagement and a willingness among residents to take action by reporting concerns to law enforcement. In terms of drug-related crimes, there has been an up-and-down pattern to the number of reports and arrests from year to year. Unlike violent crimes, arrests in drug-related activity outpaced reports. The number of both violent and drug-related crimes remained much lower in tract 6.01 than in either tracts 6.02 and 30.02 throughout the decade.

Census tract 6.02 has been considered one of the most crime-ridden areas in the City. As a result, since 2006, it was awarded federal funding for the Weed and Seed program designed to promote crime prevention through strengthened community-based efforts and collaboration with law enforcement. From 2000 through 2010, there has been a notable increase in the number of violent crime complaints reported and an equally notable decrease in the number of arrests. Though erratic in pattern from year to year, there has been an overall upward trend of complaints and arrests related to drug crime in this area.

Violent crime complaints rose gradually in census tract 30.02 from 2000 through 2010. By 2003 there was a drop in the number of arrests since the beginning of the decade; although there has been an increase since 2003 arrest levels were considerably lower by the end of the decade.

Most key informants shared the perceptions that people living in Northeast Wilmington were more likely to be proactive and report suspected criminal activities than they were in 2000. All but one participant felt that the rate of crime had decreased somewhat in the study area during that timeframe, though many voiced concerns that crime remains a significant problem in Northeast Wilmington. Data indicates that reports of violent crimes almost doubled from 2003 through 2010 while arrests increased slightly. However, there were fewer drug-related crimes reported annually by the year 2010, and there has been a slight decline in arrests for drug crimes throughout Northeast Wilmington. Aggregate study area trends in reports and arrests for both violent and drug-related crime generally parallel patterns for the City of Wilmington.

Participants hypothesized that several factors may have influenced residents to take action and report violent crime, including an increased law enforcement presence at community meetings, which fosters trust and communication between citizens and local police and

may also be interpreted as an investment in the community. Participants also attributed this, in part, to a greater sense of civic pride and engagement particularly among residents in proximity to where brownfields have been remediated and developed. Further, a number of key informants thought that the removal of dilapidated, abandoned properties has limited opportunities for illicit and illegal activity.

Many informants related the observation that the frequency of illegal dumping had decreased considerably since 2000. They attributed this to the regeneration of blighted properties, including brownfields, and the aesthetic improvements associated with such development, which increases community pride. However, relevant license and inspection complaints have risen steadily since 2007. It is difficult to know if this is because there is actually more illegal dumping or if citizens are more sensitive to the problem and motivated to report these issues than they once were and thus have them resolved. A new, automated ticketing system may also have generated higher numbers of reports in recent years.

Comparison of select health indicators throughout the study area from the first and second halves of the decade present mixed findings: there was a 10% increase in cases of low birth weight; more than double the number of congenital anomalies (from 3 cases to 7 cases); a 25% decrease in infant mortality; and a negligible decrease in the number of cancer deaths of individuals aged 45 and older. It is important to note, however, that the current study is not a full-scale health impact study, and the numbers of cases for select indicators are very small.

In terms of civic pride and engagement, a number of indicators may suggest positive trends in Northeast Wilmington that are in part related to brownfield regeneration. As mentioned before, violent crimes complaints and license and inspection reports have risen, which may denote an increased sense of community awareness and sense of efficacy among residents. New and improved properties were seen as motivation to maintain and improve one's home, not only among those who occupied the new properties, but among nearby residents as well. A new civic association was created for the residents of Speakman Townhomes. Key informants also suggested that increased involvement in civic associations and broader participation in community events (such as Toys for Tots drive and City Cleanup days) are indicators of enhanced community engagement. In addition to the changes in social indicators, nonprofit and community organizations that undertake brownfield regeneration may experience greater respect, visibility, and influence in the community, which may lead to motivating more civic engagement and positive growth.

Additionally, key informants pointed to the following as indicators of improvement in the social conditions of Northeast Wilmington: the presence of new faith-based organizations and other nonprofits; the support of four charter schools (including two that opened very recently); the opening of a healthcare clinic; the attraction of new businesses and developments (such as the private Prestwyck Townhomes); and the development and pending development of urban farms and greenspaces. Though not all are directly related to brownfield development, participants believed that availability of these new goods and

services has been, in part, generated by spillover effects of consumer demands that flow from successful brownfield initiatives.

Though all census tracts demonstrated mixed findings relating to changes in social indicators, there appears to be a positive association between the degree of brownfield regeneration, particularly the creation of safe and affordable housing, and an enhanced community profile. Census tract 6.01 has experienced the greatest degree of completed brownfield development as well as the greatest level of improvement among the social indicators. Census tract 30.02 is home of the first completed brownfield housing project, the Habitat for Humanity site on Thatcher and Heald Streets, and has also enjoyed improvement among some of the social indicators measured. Census tract 6.02, which experienced the most mixed results, has numerous projects underway but, as yet, no housing initiatives have been completed.

Despite progress that key informants perceive and link directly or indirectly to brownfield regeneration, many participants emphasized that broader economic forces have stymied the potential impact of the BDP activity in Northeast Wilmington. Requests for BDP funding have declined since the economic downturn began in 2008. Many projects that are intended to generate community activity, such as Kappa Mainstream, Inc.'s educational initiatives, have been delayed while funders seek resources to complete construction once investigation and remediation have been conducted. Kingswood Community Center and New Destiny Fellowship are other examples of nonprofit organizations that have not been able to fully implement proposed initiatives due to lack of available resources. The decline in mortgage lending has slowed the sale of newly created units in McMullen Square, which has slowed the completion of construction. It is difficult to know what benefits may have accrued had these projects been realized fully in the timeframes originally established, and it will be important to monitor changes to social indicators as development is completed and regenerated properties are in full use. As one key informant indicated, "Because of the economy, we haven't seen the multiplier effect that we had hoped for."

Limitations

There are a number of significant challenges to measuring the intangible impact of brownfield development. The greatest barrier is in being able to identify a causal relationship between the intervention (brownfield development) and any measured change given that brownfield regeneration does not occur in a vacuum but in the presence of many potentially confounding influences. For example, what kind of an impact does the greater economic climate have on indicators such as housing and employment rates; what kind of impact does another social program, such as the Weed and Seed initiative, have on crime rates? In a perfect world we would have been able to conduct a comparative analysis between the pilot community, Northeast Wilmington, and a community matching in profile (size, setting, population density and make-up, socio-economic status, geography, cultural influences, political system, etc.) that had a similar degree of brownfield properties but had

not undergone a similar degree of clustered brownfield activity. As might be expected, no such matching community exists in Delaware.

Therefore, despite the presence of multiple intervening variables, a Time 1/Time 2 comparison of select social variables was considered the most feasible approach to piloting the model. The use of qualitative methods provided a focusing lens through which to interpret relevant quantitative data, and to help isolate how brownfield development may influence change among social indicators. However, the use of key informants creates other challenges.

Key informants are selected because of their significant subject matter expertise; in this case, their longstanding experiences relating to Northeast Wilmington and/or brownfield development. Because of this experience, selected participants are in a position to observe and represent other members of the community. Although key informants strive to remain objective in their reporting, bias may enter into their observations based on their personal investment in community revitalization. To help mitigate this, we sought a cross-section of perspectives among community advocates from grassroots organizations (such as civic associations) as well as advocates working through established nonprofit organizations, government representatives, and nonprofit and private developers who have engaged directly with the BDP. The semi-structured nature of the interviews allowed for in-depth discussion regarding observations and perceptions.

An additional limitation to the project is that although the basis of a social impact assessment (SIA) is a prospective approach engaging all stakeholders in a proactive manner, a lack of baseline data necessitated retrospective data collection. While future assessments may build upon the baseline established in this study and allow for a prospective assessment, the current study was subject to history effects such as the economic changes and other variables previously noted. The retrospective approach may also have impacted the accuracy of perceptions provided by key informants as they attempted to recall previous conditions and trends. In addition, due to lack of availability of some sources of quantitative data dating back to the year 2000, changes among some social indicators could not be measured from the same point in time as others (for example, license and inspection reporting data prior to the year 2007 could not be obtained).

There are a number of limitations related to secondary data sources. For example, changes in US Census survey instruments used in 2000 and 2010 created the need to compare census data with American Community Survey five-year estimates for indicators such as income level and housing values. Furthermore, these sources have wide margins of error, which are compounded when studying smaller units.

Another major consideration in interpreting the findings is that new state-certified brownfield development projects begin, unfold, and are completed on a continual basis, and the degree to which projects are fully realized appear to impact social indicators. The difference in scale of a given project also is likely to influence trends. Therefore, it will be important to observe changes that may follow the completion of projects such as the newer Habitat for Humanity properties, or the initiation of the prison re-entry program that will

take place once the Kappa Mainstream, Inc. facility is constructed, or the new land use of the former Wiley Cork factory or Diamond State Salvage site.

Despite the significant degree of brownfield regeneration that has taken place (or is taking place) in Northeast Wilmington, by all estimates there are likely to be many other brownfields or more severely contaminated properties in the region not yet identified or targeted for remediation and reuse. The assessment of social impacts of brownfield development should be viewed in relation to the total amount of contaminated properties in a given region.

Finally, it is important to remember that this is a pilot test, limited in scope, of select indicators to explore the feasibility and promise of a proposed evaluative framework to assess the social impacts of brownfield development. Additional sampling and a survey of community members may reveal other findings and considerations.

Conclusions, Recommendations, and Implications

This report describes the adaptation and piloting of select elements of a social impact assessment model for brownfield development. The exploratory study was conducted in Northeast Wilmington, an urban environmental justice community in New Castle County, Delaware, that has undergone a significant degree of brownfield regeneration. Four central research questions guided the study and are now discussed.

Question 1: What Methodology can Measure the Intangible Impacts Produced by the Brownfields Development Program (BDP) in Northeast Wilmington?

The social impact assessment model (SIA) is a promising approach for evaluating the intangible impacts and spillover effects of brownfield development. The prospective method is based upon a participatory engagement of all stakeholders in decision-making and planning processes, as well as the ongoing assessment, of a given project or program. In particular, SIA emphasizes the need to consider the intended and unintended consequences of a proposed intervention on the most vulnerable of stakeholders; in environmental justice communities the most vulnerable are community members.

Although SIA is prospective in theory, we adapted the model to retrospectively establish baseline measures of social variables. One of the goals of the current study was to explore the association between brownfield regeneration that had taken place since the inception of the Delaware BDP and changes within the community. This required measuring changes in select social indicators over time across the following domains: demographics; civic engagement/empowerment and community pride; neighborhood economy; health and safety; cultural/aesthetics; and perceptions and awareness of community members.

Quantitative data was collected from sources such as the Census and American Community Survey, and other public records (crime, health, licensing and inspection, etc.).

However, a hallmark of SIA is the use of qualitative data from primary sources, which is extremely valuable in understanding perceptions of community members and insights regarding how observed trends might be related to brownfield development. This is especially beneficial when the association may be indirect, a likely scenario when considering the impact of brownfield regeneration. As part of this study, key informants were interviewed regarding their knowledge and experience with the Delaware BDP and brownfield regeneration in Northeast Wilmington. Participants also provided a wealth of information on other factors they believed were associated with changes in the community, or that limited the social impact of brownfield regeneration.

SIA is a strategy for promoting continuing participation of all stakeholders to monitor the impacts of proposed interventions and also to provide recommendations for program improvement and policy development. It is important to bear in mind that this was a pilot study designed to explore the feasibility of the assessment approach while simultaneously exploring the program's impact. Although this initial SIA of the Delaware BDP in Northeast Wilmington was limited in scope and retrospective in design, the foundation for ongoing, prospective assessment is now in place.

(Recommendations for adapting and replicating SIA are discussed in Question 4. The SIA framework and guidelines for replicating the model are included in the Appendices.)

Question 2: Using SIA, What Appear to be the Primary Intangible or Social Impacts Produced by BDP Initiatives in Northeast Wilmington?

The trends observed in the pilot study suggest that the BDP activity in Northeast Wilmington has contributed to neighborhood stabilization and revitalization. Specifically, areas with the greatest degree of completed brownfield regeneration, particularly development of safe and affordable housing, appeared to experience the most positive trends in the following domains: neighborhood economy (such as income levels, housing values and tenure, employment, educational attainment, and the attraction of private development and new businesses); civic pride and community engagement (characterized by increased participation in community events, increased reporting of suspected criminal activity, etc.); aesthetics (improved maintenance of property, perceived decline in the rate of illegal dumping); enhanced community infrastructure and services (additional community-based educational services, a new health clinic, more faith-based initiatives); health and safety (increases in crime reports and decreases in arrests, and the availability of fresh and affordable produce through urban gardening efforts); and enhanced community leadership by nonprofit organizations engaged in brownfield development (*e.g.*, New Destiny Fellowship and community development corporation, Habitat for Humanities, etc.).

However, negative indicators were also observed, including: income disparities; declines in income levels, employment rates, and specific levels of educational attainment in specific areas; and increases among certain public health markers.

Overall, key informants repeatedly reported that positive changes were occurring throughout Northeast Wilmington, and they associated these changes, at least to some degree, directly or indirectly with brownfield regeneration. However, they also reiterated that these changes were occurring slowly and perceived that broad economic factors limited the progress of brownfield development; therefore, more time would be needed to fully assess the program's benefits. In addition, they recommended more in-depth analysis, including attitudinal surveys of community members to measure perceptions of changes that may be related to brownfield development.

Question 3: What Recommendations Could Enhance the Delaware BDP to Minimize Negative and Maximize Positive Social Impacts?

The Delaware BDP was perceived to be a very effective and efficient program, despite the intricate and multi-component processes involved in seeking certification, obtaining funding, and seeking and obtaining all necessary approvals. Project managers and the program administrator were considered extremely knowledgeable, flexible, “pro-development,” responsive and sensitive to the needs of developers, particularly nonprofit developers operating with limited resources, and to the needs of community members when they were expressed. BDP personnel were characterized as easy to work with, particularly in comparison with other government entities, and highly effective at facilitating progress relating to individual projects. It is telling that all key informants who were brownfield developers reported they would work with the Delaware BDP when and if opportunities and needs were to arise in the future.

The most common criticism of the program was that the BDP is not visible enough, and therefore is underutilized, which lessens its overall potential impact as a conduit for community engagement and renewal. Further, the BDP provides funding when individual developers submit proposals that meet grant requirements. In this regard, the BDP is responsive to initiatives that are generated based upon the individual goals of individual developers. While the vast majority of brownfield activity in Northeast Wilmington has been conducted through nonprofit organizations investing in community revitalization, these efforts have been piecemeal; regeneration has not resulted as part of a holistic, transformative strategy for community revitalization led by the BDP.

The EPA originally envisioned brownfield regeneration as a transformative catalyst through which genuine environmental justice could be achieved. Findings from the Northeast Wilmington case study suggest that the BDP, directly and indirectly, has had a positive social impact upon a community that continues to face serious challenges. However, this impact appears limited, in part, due to the responsive nature of the program. ***The BDP appears to have the potential to heighten its social impact considerably if it***

takes on a more proactive leadership position in community development in full partnership with all other planning strategists. In this role, the BDP would ideally use SIA to facilitate a greater degree of community participation. In her legal note, Pippin highlights the New Jersey Brownfields Development Area (BDA) initiative as exemplifying this approach:

Established in 2002, the BDA approach requires the state environmental group, the New Jersey Department of Environmental Protection (DEP), to work with communities containing multiple brownfield sites in close proximity to each other to design and implement remediation and reuse plans for each property simultaneously....to provide a redevelopment framework for urban communities ...The DEP requires a heightened level of community involvement in the application process before it will accept and consider the proposal. Among the various requirements is documentation evidencing support from local community members and community or civic organizations. The application also requires a discussion of overall community aspirations for the brownfields redevelopment within the BDA. In addition to brownfield properties, the application also takes into consideration the uses of non-brownfield properties, other area features, and existing infrastructure.... This approach achieves the goal of remediation and revitalization of entire communities and neighborhoods, instead of just the individual properties themselves. New Jersey has made a significant attempt to bring together developers, government officials, and community stakeholders in a coordinated way that yields effective remediation and economic benefits for everyone involved. (2009, pp 605-606)

We offer the following recommendations, which dovetail with the prospective, proactive philosophy of SIA, to raise the profile and enhance the impact of the Delaware BDP while fostering community participation. These strategies would also likely strengthen the BDP's role as a leader in partnership with community members and organizations, government entities, and other stakeholders in establishing and implementing holistic and coordinated planning efforts that incorporate brownfield regeneration in order to revitalize environmental justice communities and other communities:

- Appoint a statewide BDP coordinator to work in conjunction with the designated public information officer in promoting the program and informing the public of the benefits and opportunities it provides.
- In conjunction with the Brownfield Advisory Committee, consider strategies for generating brownfield proposals that can be integrated into holistic, communitywide planning initiatives versus stand-alone projects.
- In conjunction with the Brownfield Advisory Committee, review existing BDP policies and procedures to identify opportunities for formally and aggressively engaging community members and organizations in establishing brownfield development priorities and providing ongoing feedback regarding development efforts.

- Maintain an ongoing, sustained, and visible presence at community-level forums, such as neighborhood planning council meetings, civic association meetings, and community events, including but not limited to those related to brownfield development.
- Maintain an ongoing, sustained, and visible presence at all City, County, and State forums that address issues pertaining to planning, zoning, housing and development, land use and revitalization efforts, and environmental issues.
- Expand collaborative relationships with additional nonprofit entities and maintain existing relationships with current nonprofit BDP developers. Nonprofits such as Cornerstone West and Habitat for Humanity have proven to be stalwart partners in brownfield regeneration. The Nonprofit Capacity Building Program at the University of Delaware Center for Community Research and Service may be a valuable resource in fostering these working relationships.
- Develop web-based and printed outreach materials, such as a brochure highlighting the successes of the Delaware BDP or a simple pamphlet that outlines the “who, what, where, when, why, and how” nuts-and-bolts of the program.
- Continue to inventory brownfield properties in the state to populate and expand the Brownfield Marketplace database for the benefit of prospective developers.
- Sponsor public meetings for all proposed development initiatives, not only for large or potentially controversial proposals, and continue to participate in outreach efforts led by developers.
- Utilize existing grassroots networks, notably faith-based organizations, to engage community members and communicate information regarding brownfield development initiatives and opportunities.
- Utilize social media in order to engage community members and communicate regarding brownfield development initiatives and opportunities.

Several other recommendations regarding programmatic changes emerged throughout key informant interviews worthy of consideration:

- Re-evaluate requisite procedures and paperwork to determine if any steps may be streamlined, and incorporate adjustments as appropriate.
- Allow a portion of BDP funding to be used by brownfield developers to conduct outreach and education on relevant environmental issues so that brownfield development is a dynamic, “teachable moment” for communities.

- Re-evaluate levels of remediation required for properties with minimal levels of contamination to maximize BDP funds.

Question 4: How can SIA be Adapted for use in Evaluation of Brownfield Development Programs Elsewhere?

In this pilot, we selected specific social indicators to measure changes in the community of Northeast Wilmington, and considered whether these changes may be attributable to some degree to brownfield development. The methodology is adaptable for use by other brownfields programs attempting to measure social impact. The SIA adaptation of brownfields assessment and guidelines for replication are presented in Appendix A.

Because it is highly improbable that otherwise matching communities with the same amount of brownfields but experiencing different degrees of redevelopment exist, we propose an adaptation of SIA that will measure a change among social indicators in a specific study area over time. As you will see from SIA Model (Appendix B), this approach focuses on changes in variables across seven domains: demographics; civic engagement/empowerment and community pride/interaction; neighborhood economy; health and safety; culture and aesthetics; perceptions and awareness of community members; and physical environment. Within each domain are a series of potential indicators that researchers may wish to use to measure change over time. The framework rates the degree of importance for each variable; whether changes can be measured using primary or secondary data, or both; and a variety of potential data sources for each indicator. Selection of indicators for measurement, along with specific data sources, will depend upon many factors, including funds for conducting the assessment, time, staff and their expertise, and the availability of public records and other types of information sources.

It would be ideal if BDP programs established, from baseline, evaluation strategies to measure social variables over time. The prospective design would include a timetable for future measurements against the same indicators at designated intervals. Similarly, it would be possible to assess existing programs that have been “up and running” prospectively by conducting a current baseline assessment and establishing a time-table for future measurements. However, if researchers are interested in conducting an assessment to measure the impact of brownfield programs thus far, it will be necessary to construct a baseline of social indicators by retrospectively collecting data for a specified time, and measuring changes that have occurred since then. ***Regardless of whether the initial assessment is retrospective or prospective, we recommend that future assessments be conducted periodically to inform planning and development strategies, program improvement, and to foster the ongoing involvement of stakeholders, particularly community members.***

Because of the difficulty in isolating trends that are related to brownfield regeneration in light of other variables, qualitative methods will be vital. Key informant interviews and

focus group discussions, surveys of perceptions of community members, anecdotal information, such as news accounts, and/or other observations will be valuable in discerning links between observed trends and brownfield development.

SIA is an approach that emphasizes participation of all stakeholders involved in the decision-making process at each stage of a project or program in order to optimize benefits for all concerned, and minimize the risk of harm, particularly to the most vulnerable. ***If SIA is conducted routinely, brownfields development programs have the potential to become increasingly prospective in terms of self-evaluation of their social impacts, and would therefore be in a position to take on a more proactive and transformative role in promoting community revitalization. The goal of SIA is not only to conduct a one-time assessment, but also to allow for continuing participation of all stakeholders, especially the most vulnerable – in this case, members of environmental justice communities.*** Repeating SIA at pre-determined intervals will provide citizens with continual opportunities to communicate needs, share input, and have the capacity to significantly impact their community's evolution.

Recommendations for Future Steps

The current study represents an exploratory effort to identify and test a promising approach to assessing the social impacts of brownfield development programs. Although the results were mixed, they suggest that in a number of aspects, the community of Northeast Wilmington demonstrated positive changes over time, and that many of these changes appeared directly and indirectly linked to brownfield regeneration and its spillover effects. As more brownfield development occurs, it will be beneficial to measure future trends among social variables.

Due to resource limitations, select indicators were measured and input was solicited from key informants. In the future, a community-based survey would be beneficial in understanding more fully the perceptions and observations of residents regarding brownfield development and the role of the BDP. Ideally, such a survey would also incorporate a needs assessment component so that participants could share their ideas of how to enhance the community. Other strategies for consideration are focus group interviews, GIS mapping, and a comprehensive health impact assessment.

Although it was not demonstrated in the current case study, gentrification and displacement have been identified as not uncommon unintended consequences that negatively impact residents of communities where brownfield regeneration occurs. SIA and its emphasis on engaging vulnerable groups will be an important means to anticipate, monitor, and ameliorate potentially negative impacts.

The results of this study indicate that brownfield regeneration not only serves to reduce environmental risk and produce economic benefits, but also holds the potential to enhance the social well-being of residents in environmental justice communities. The difficulty in clearly ascribing social impacts solely to brownfield regeneration has been acknowledged

throughout this report. But it appears more prudent to instead consider how SIA can be employed by brownfields development programs to transition to more proactive and transformative roles in leading efforts to achieve genuine environmental and social equity. This study will hopefully stimulate greater interest in measuring the social impacts of brownfield regeneration, and understanding the value of brownfields development programs as catalysts for environmental justice.

References

- Beierle, T.C. and Cayford, J., 2002. *Democracy in practice: public participation in environmental decisions*. Washington DC: Resources for the Future.
- Burdge, R. J. (2003). Principles and guidelines for social impact assessment in the USA. *Impact Assessment and Project Appraisal*, 231-250.
- Center for Applied Demography & Survey Research, University of Delaware. (2010). *Economic impact on Delaware's economy: The Brownfield Program*. Newark, DE. Retrieved from: <http://128.175.63.72/projects/DOCUMENTS/brownfield.pdf>
- Center for Energy and Environmental Policy, University of Delaware. (2001). *The brownfields challenge: A survey of environmental justice and community participation initiatives among ten national brownfield pilot projects*. Newark, DE. Retrieved from: http://www.ceep.udel.edu/publications/ej/reports/ej_brownfields_challenges/fullreport.pdf
- Center for Energy and Environmental Policy, University of Delaware. (2003). *Community environmental profiles – A tool for meeting environmental justice goals: An analysis of the City of Wilmington*. Newark, DE. Retrieved from: http://www.ceep.udel.edu/publications/ej/reports/ej_community_environmental_profiles/2003_community_environmental_profiles.pdf
- City of Wilmington website. (2012). Wilmington, DE. Retrieved from: <http://www.wilmingtonde.gov>
- Delaware Code Title 7 Chapter 91 subchapter II (Brownfields Development Program) (2004).
- Department of Planning & Development, City of Wilmington. (2012). *Neighborhood comprehensive development plan for the Price's Run/Riverside-11th Street Bridge Analysis Area*. Wilmington, DE. Retrieved from: <http://www.wilmingtonde.gov/docs/1054/NCDP-PricesRun-Riverside-11thStreetBridge-Analysis-Area.pdf>
- Environmental Protection Agency (EPA). (2009). Addressing Environmental Justice in EPA Brownfields Communities. Washington, DC: Retrieved from: http://epa.gov/brownfields/policy/ej_brochure_2009.pdf
- Environmental Protection Agency (EPA). (2012). Brownfields and Land Revitalization, Basic Information. Retrieved from: http://www.epa.gov/brownfields/basic_info.htm

Environmental Protection Agency (EPA). (2012). [Environmental Justice Basic Information](http://www.epa.gov/environmentaljustice/index.html). Retrieved from: <http://www.epa.gov/environmentaljustice/index.html>

Environmental Protection Agency (EPA). (2012). [Strategies for Advancing Smart Growth, Environmental Justice, and Equitable Development](http://www.epa.gov/dced/pdf/2012_0208_creating-equitable-healthy-sustainable-communities.pdf). Washington, D.C. Retrieved from: http://www.epa.gov/dced/pdf/2012_0208_creating-equitable-healthy-sustainable-communities.pdf

Essoka, J. (2010). The gentrifying effects of brownfields. *The Western Journal of Black Studies*, 34(3), 299-315.

Gallagher, D.R. & Jackson, S.E. (2008). Promoting community involvement at brownfields sites in socio-economically disadvantaged neighbourhoods. *Journal of Environmental Planning and Management*, 51(5), 615-630.

Greenberg, M. and Lewis, M.J., 2000. Brownfields redevelopment, preferences and public involvement: a case study of an ethnically mixed neighbourhood. *Urban Studies*, 37(13), 2501– 2514.

Hutch, D.J., Bouye, K.E., Skillen, E., Lee, C., Whitehead, L., & Rashid, R. (2011). Potential strategies to eliminate built environment disparities for disadvantaged and vulnerable communities. *American Journal of Public Health*, 101 (4), 587-595.

Interorganizational Committee on Guidelines and Principles for Social Impact Assessment. (1994). Guidelines and principles for social impact assessment. *Impact Assessment*, 12(2), 107-152.

McKinsey and Company, Urban World. (n.d.) The history of social impact assessment. Retrieved from: <http://lsi.mckinsey.com/what-is-social-impact-assessment/the-history-of-social-impact-assessment#1990>

Nagengast, A., Hendrickson, C., & Lange, D. (2011). Commuting from U.S. brownfield and greenfield residential development neighborhoods. *Journal of Urban Planning and Development* 137 (3), 298-304.

National Environmental Justice Advisory Council (NEJAC). (2006). [Unintended impacts of redevelopment and revitalization efforts in five environmental justice communities](http://www.epa.gov/compliance/ej/resources/publications/nejac/redev-revital-recomm-9-27-06.pdf). Washington, DC. Retrieved from: <http://www.epa.gov/compliance/ej/resources/publications/nejac/redev-revital-recomm-9-27-06.pdf>

Pearsall, H. (2009). Linking the stressors and stressing the linkages: Human - environment vulnerability and brownfield redevelopment in New York City. *Environmental Hazards*, 8(2), 117-132.

- Perkins, D.D., Larsen, C., & Brown, B.B. (2009). Mapping urban revitalization: Using GIS spatial analysis to evaluate a new housing policy. *Journal of Prevention & Intervention in the Community*, 37(1), 48-65.
- Pippin, A.M. (2009). Community involvement in brownfield redevelopment makes cents: A study of brownfield redevelopment initiatives in the United States and Central and Eastern Europe. *The Georgia Journal of International and Comparative Law*, 37 (Summer), 589-619.
- Porter, M. (2009). The geography of New York State's Brownfield Cleanup Program: Population and land value characteristics of areas surrounding New York City properties enrolled in New York State's Brownfield Cleanup Program. *Environmental Practice*, 11(4), 245-255.
- Site Investigation & Restoration, Department of Natural Resources and Environmental Protection (DNREC), State of Delaware. (2012). *Brownfields*. Dover, DE. Retrieved from: <http://www.dnrec.delaware.gov/whs/awm/SIRB/Pages/Brownfields.aspx>
- Small Business Liability Relief and Brownfields Revitalization Act (Pub .L.No. 107-118, 115 stat. 2356, "the Brownfields Law") (2002).
- Tzoumis, K. & Bennett, S. F. (2009). Perspective: The brownfield professional team. *Environmental Practice*, 11(3), 212-214.
- Vanclay, F. (2006). Principles for Social Impact Assessment: A critical comparison between the International and US documents. *Environmental Impact Assessment Review* 26(1), 3-14.
- Vanclay, F. (2003). International principles for Social Impact Assessment. *Special Publication Series Number 2 of the International Association for Impact Assessment*. Retrieved from: <http://www.iaia.org/publicdocuments/special-publications/SP2.pdf>
- Wedding, G.C. & Crawford-Brown, D. (2007). Measuring site-level success in brownfield redevelopments: A focus on sustainability and green building. *Journal of Environmental Management*, 85, 483-495.

Statistical Data and Additional Sources

- American Community Survey and US Census data (population, gender, race, education, employment, poverty and income, housing, and housing values) were retrieved from the American FactFinder database:
<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

Criminal statistics were obtained from the Criminal Justice Council, Statistical Analysis Center, State of Delaware, Dover, DE.

Health statistics were obtained from the Department of Public Health, Health Statistics Center, State of Delaware, Dover, DE.

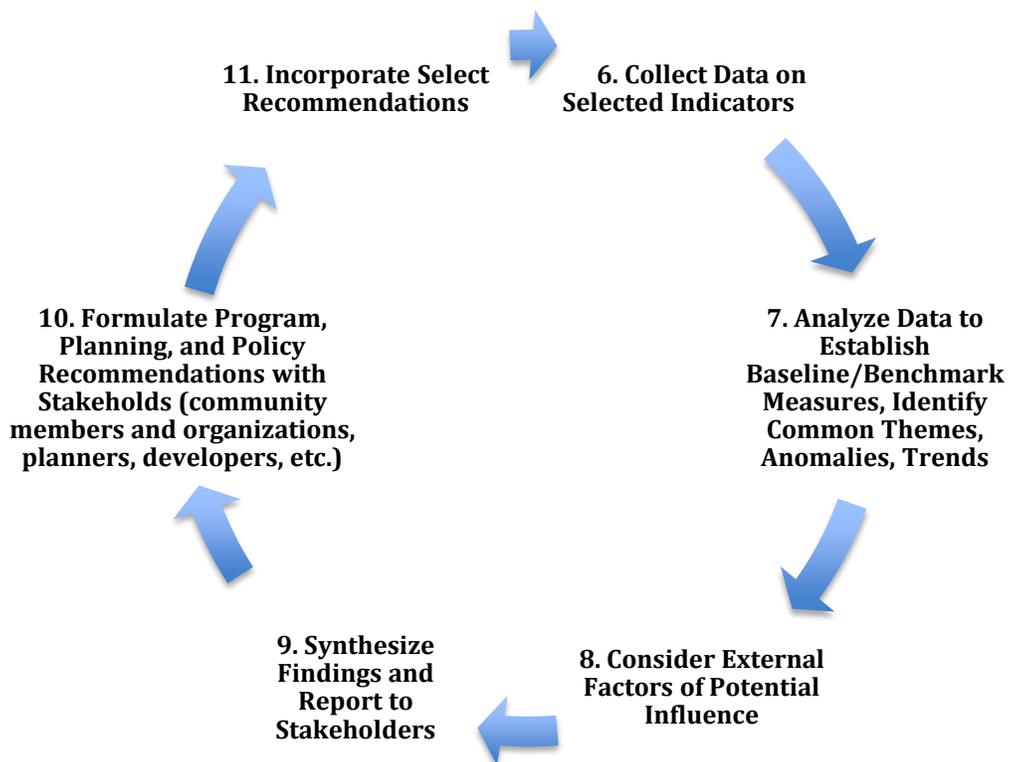
Licenses & Inspection reports were obtained from the Licenses & Inspection Department, City of Wilmington, Wilmington, DE.

Photos Brownfields Map of Northeast Wilmington were provided by the Delaware Brownfields Development Program, Site Investigation & Restoration, Department of Natural Resources and Environmental Protection (DNREC), State of Delaware, Dover, DE.

Appendices

Appendix A: Social Impact Assessment (SIA) Model for Brownfields Development Programs and Initiatives

1. Define Geographic Scope of Assessment
2. Prospective vs. Retrospective Study?
3. Establish Time Frame for Benchmark Measurements
4. Select Social Indicators
5. Select Primary and Secondary Data Sources



Guidelines for Conducting a Social Impact Assessment (SIA) of a Brownfields Development Program

Planning Phase

The following decisions should be made during the preliminary stage of the brownfields development program SIA. The options selected will be dictated by specific evaluation goals and the availability of resources necessary to establish the process for conducting ongoing, participatory assessment of brownfield regeneration in a given region.

Define Geographic Scope of Assessment

Researchers will first need to define the study area for assessment: country; state; region; county; city; community; census tracts; etc. A broader study area will require more time not only for baseline assessment but for future assessments. A larger assessment area is also likely to encompass a greater degree of external influence than a smaller area, which will increase the challenge of linking observed social impacts to brownfields regeneration.

Prospective versus Retrospective Study

Although the goal will be to transition towards an ongoing, prospective, participatory model of SIA, researchers may wish to estimate the impact that a brownfields development program has had to date on a specific region (such as in the Northeast Wilmington case study). This will involve retrospectively constructing a baseline profile using select indicators against which to measure current or future changes. Due to limited availability of historical information, researchers using a retrospective design may need to change or supplement data sources to capture sufficient information. There are additional challenges associated with capturing attitudinal information from primary sources retrospectively.

However, if a program is new, or if researchers do not wish to estimate a program's impact to date, a prospective design may be chosen. The prospective study will allow researchers or program administrators to "build in" data collection strategies for specific social indicators.

Establish a Timeframe for Benchmark Measurements

Whether a retrospective or prospective design is used for the initial assessment, ongoing, participatory assessment will also provide feedback useful for program improvement and planning priorities. A timeline for future evaluation should be established in the planning phase because it holds implications for the selection of social indicators and data collection strategies.

Select Social Indicators and Primary and Secondary Data Sources

Appendix B depicts the Social Impact Assessment (SIA) Framework, which highlights a variety of social indicators across the following domains: demographics; civic engagement/empowerment and community pride/interaction; neighborhood economy; health and safety; culture and aesthetics; perceptions and awareness of community members; and physical environment. By measuring changes in select social indicators across domains from one time to the next, researchers will be able to observe trends occurring within the study area. By using a combination of quantitative and qualitative data

sources researchers will be able to gain insights regarding the changes observed and their potential relationship with brownfield development.

As Appendix B illustrates, secondary data sources include but are not limited to census data sets, public health and safety records, market analyses, and geographic information system (GIS) mapping, etc. Primary data sources include key informant interviews, focus group interviews, and community member surveys that solicit perceptions and attitudes regarding changes over time throughout the study area across domains, and their perceived relationship to brownfield development. (A sample key informant semi-structured interview questionnaire is included in Appendix E.) Community resource guides, news articles, minutes from civic forums, and agency reports are examples of additional supplemental data resources.

The selection of indicators for measurement and the types and amount of data sources used will depend upon staffing resources and time and money available for data collection. However, both quantitative and qualitative strategies should be incorporated into the study design.

Data Collection, Analysis and Synthesis, and Implementation of Recommendations Phase

Once the preliminary decisions are made, data will be collected and analyzed, and select recommendations will be implemented to improve brownfields development program performance and to maximize its impact on social well-being. Specific steps include the following:

Collect Data on Selected Indicators

Collect data on chosen social indicators for baseline and subsequent time periods using selected secondary data sources. Through primary data sources, solicit perceptions regarding changes observed along specific indicators, and whether these changes appear to be associated to any degree with brownfield development.

It is important to note that although primary sources may be highly engaged in and knowledgeable of the community, and may be very familiar with brownfield projects, they may not *know* that specific development projects are, in fact, brownfield developments. Therefore, it will be necessary to ascertain their knowledge of specific brownfield initiatives within the study area. However, once informed that specific sites are brownfields in some phase of regeneration, participants may be very capable of reporting on the perceived social impacts of these projects (as was the case in the Northeast Wilmington study).

Primary sources will be valuable in identifying external influences (widespread or local social, environmental, economic influences; other community-based programs; additional development initiatives; etc.) that may also be associated with changes in social indicators.

Analyze Data to Establish Baseline/Benchmark Measures, Identify Common Themes, Anomalies, Trends

Once all data is collected, researchers will analyze it to develop a baseline profile of the community across domains and to measure changes over time, and identify common themes, anomalies, and trends.

Consider External Factors of Potential Influence

Changes observed among social indicators should be interpreted in light of potentially confounding factors in order to consider the likely social impact of brownfield development upon the community. For example, in the Northeast Wilmington study, the sluggish global economy was repeatedly cited as limiting funding for construction in many development projects, including state-certified brownfields. This was thought to have stunted community revitalization. At the same time, successful initiatives co-occurring with brownfield development would make it challenging to clearly delineate the impact of the brownfields program on an enhanced community profile. As previously noted, primary sources will be valuable in understanding the contributions of brownfield regeneration towards community change.

Synthesize Findings, and Formulate Program, Planning, and Policy Recommendations with Stakeholders

The results of all aspects of data collection and analysis will inform recommendations for brownfield program improvement. In addition, needs and perceptions identified through the SIA can inform policy and planning recommendations for community development, and shape the role of the brownfield development program in catalyzing environmental justice. In concert with involved stakeholders, select program, policy, and planning recommendations for implementation.

Incorporate Select Recommendations

Implement selected program modifications to enhance performance and further community development.

SIA as a Continual Process

The cycle of data collection, analysis and synthesis, and the development and implementation of program, planning, and policy recommendations should recur at predetermined intervals.

Appendix B: Social Impact Assessment (SIA) Framework for Measuring Changes among Social Indicators over Time

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
DEMOGRAPHIC	Total population	X				X	Census and/or American Community Survey data
	Ethnic/Racial distribution	X				X	Census and/or American Community Survey data
	Displacement/Relocation	X			X	X	Research institutions, market analyses, key informants, focus groups, survey
	Influx/Outflow of temporaries		X		X	X	Research institutions, market analyses, key informants, focus groups, survey
	Presence of seasonal residents				X	X	Research institutions, market analyses, key informants, focus groups, survey
	Education level	X					X

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
CIVIC ENGAGEMENT/ EMPOWERMENT/ COMMUNITY PRIDE/COMMUNITY INTERACTIONS	Presence of volunteer organizations	x				x	Count of voluntary organizations
	Activity level of volunteer organizations	x			x	x	Change in membership/ attendance, organizational accomplishments
	Presence of interest groups	x				x	Count of interest groups
	Activity level of interest groups	x			x	x	Change in membership/ attendance, organizational accomplishments
	Community infrastructure	x				x	Count of community resource centers/ networks (e.g., health centers, youth centers, community centers, senior centers, etc.)

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
	Engagement of community members / volunteerism	X			X	X	Organization records, voter registration, contacts to elected officials, media sources, public records, key informants, focus groups, survey
	Presence/absence of community leaders	X			X	X	Organization records, public records, key informants, focus groups, survey, media sources
	Evidence of interorganizational cooperation	X			X	X	Organization records, public records, key informants, focus groups, survey, media sources
	Historical experience w/ change		X		X	X	Organization records, public records, key informants, focus groups, survey, media sources,
	Local, Regional, and National linkages		X		X	X	Organization records, public records, key informants, focus groups, survey, media sources
	Community engagement	X				X	X

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
	in planning and zoning process						records, key informants, focus groups, survey, media sources
	Presence, absence, or change in intracommunity conflicts (such as old timers/new comers, racial tension, etc.)	x			x	x	Organization records, Key informant interviews, focus groups, survey, media sources, public records

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
NEIGHBORHOOD ECONOMY	Employment opportunities	x				x	Census/ American Community Survey, unemployment data, commerce data
	Employment characteristics	x				x	Census/ American Community Survey, employment data
	Income	x				x	Census/ American Community Survey, employment data
	Housing value/tenure	x				x	Census/ American Community Survey, market analyses
	Housing Stock	x				x	Census/ American Community Survey
	Rate of home ownership	x				x	Census/ American Community Survey

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
	Occupancy rate	x				x	Census/ American Community Survey
	Vacancy rate	x				x	Census/Americ an Community Survey
	Commercial activity (measures of business successes and failures, new businesses, etc.)	x			x	x	Commerce and other public records, key informants, focus groups, survey

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
HEALTH and SAFETY	Public health indicators	x			x	x	Public health records, key informants, focus groups, survey
	Street life	x			x	x	Key informants, focus groups, survey, media sources, public records
	Illegal Dumping	x			x	x	Key informants, focus groups, survey, media sources, public records
	Crime/Public safety	x			x	x	Key informants, focus groups, survey, media sources, public records

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
CULTURAL/ AESTHETICS	Home improvement efforts	x			x	x	Observation, public record (licenses, permits, etc.), key informants, focus groups, survey
	Beautification efforts (individual or community)	x			x	x	Observation, key informants, focus groups, survey, media sources, public records
	Change/preservation in cultural/historical heritage		x		x	x	Key informants, focus groups, survey, media sources, public records, organization records

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
PERCEPTIONS and AWARENESS OF COMMUNITY MEMBERS	Environmental issues	X			X		Key informants, focus groups, survey
	Brownfield Development Program	X			X		Key informants, focus groups, survey
	Health risks	X			X		Key informants, focus groups, survey
	Crime/Public safety	X			X		Key informants, focus groups, survey
	Social networks (family/friends/acquaintances)		X		X		Key informants, focus groups, survey
	Community satisfaction	X			X		Key informants, focus groups, survey
	Community pride	X			X		Key informants, focus groups, survey
	Impact of volunteer associations	X			X		Key informants, focus groups, survey
	Impact of interest group associations	X			X		Key informants, focus groups, survey
	Belief in/trust in the political/social system	X			X		Key informants, focus groups, survey

	Indicator	Important	Recommended	Essential to Some Regions	Primary Data	2nd Data	Potential Data Source
PHYSICAL ENVIRONMENT	Traffic patterns	x				x	Public records, GIS
	Land use patterns	x				x	Public records GIS
	Protecting flora and fauna	x				x	Research institutions, interest group data

Appendix C: State-Certified Brownfield Properties in Northeast Wilmington, DE

Location & Site Description Information						Brownfield Developer Information		Environmental/Resource Information	
Site Name	Address	Funding	Acres	Census Tract	Date Certified	Name	Intended Use	Current Status	Prior Site Use
Purina Tower A	3101 -3400 Edgemoor Ave.; 3410 Bellvue; 1409 Eastlawn Ave.	\$259,422	8	6.01	1.22.10 and 04.01.10	Brandywine School District	Combined administrative center and maintenance facility	Remedial investigation completed; no remedial activity; no development	Pet food manufacturing, maintenance yard
DelSteel Property	8 Eastlawn Ave.	\$231,716	.52	6.01	n/a	Eastern States Development Company, Inc.	Affordable, mod-lo income 'workforce' housing	Remedial investigation completed; remediation completed; 20 of 38 townhomes completed	Steel manufacturing facility
Delta Outreach	330 East 30th St.	\$87,344	1.62	6.01	3.11.11	Delta Outreach and Educational Center, Inc.	Educational/vocational and outreach center	Remedial investigation complete; remediation plan approved; awaiting final development plan	Baseball field, office building
605 Vandever Avenue	605 Vandever Avenue	\$206,080	0.52	6.01	7.29.05 and 7.30.08	Our Youth Inc.	Affordable mod-lo income housing	Remedial investigation and remediation completed; 5 of 10 townhomes completed	Auto repair facility, underground tanks
Speakman Townhomes	301 East 30th Street	\$2,223,765	6.2	6.01	2.10.05	Cornerstone West Community Development Corporation & Ingerman	Affordable, mod-lo income housing	Remedial investigation and remediation completed; 71 townhomes constructed.	Brass casting manufacturing, electroplating, machine, assembly and finishing shop

Location & Site Description Information						Brownfield Developer Information		Environmental/Resource Information	
Site Name	Address	Funding	Acres	Census Tract	Date Certified	Name	Intended Use	Current Status	Prior Site Use
Franklin Fibre	909 East 14th Street	\$2,794	.05	6.02	6.22.11	Franklin Fibre-Lamitex Corporation	Expansion of parking for adjacent business	Remedial investigation completed; no remedial activity or proposed plan	Railroad bed/buffer
Bell Funeral	1914, 1920, 2000, 2004 North Market St.	\$12,782	0.82	6.02	6.20.06	Brandywine Village II, LLC	Office, residential, parking	Some remedial investigation completed; no remedial activity or proposed plan	Printing operation, storage tanks
901 East 17th Street	901 East 17th Street	\$74,195	+/- 8	6.02	3.11.11	City of Wilmington	Community garden and park	Remedial investigation underway; proposed plan in place	Dry cleaner
Wiley Cork	1400 North Church St., 904-906 East 16th Street	\$1million BF grant \$24,220 – BRLF grant	3.79	6.02	7.29.05	New Destiny Fellowship Church	Community support activities (educational, health and day-care facilities, place of worship)	Remedial investigation and remediation completed; partially developed	Heavy industrial activity
38 Vandever Avenue	38 Vandever Avenue	\$187,635	.3	6.02	3.24.06	Kappa Mainstream Leadership, Inc.	Community center for education and mentoring	Remedial investigation and remediation completed	Machine shop and foundry
Habitat for Humanity	97 Vandever Avenue	\$841,728	.3	6.02	1.04.08	Habitat for Humanity of NCC	Affordable housing (21 townhomes)	Remedial investigation and remediation underway; partially constructed	Textile manufacturing
Diamond State Salvage	1300 North Pine, 1300 North Spruce, 702 East 14 th St.	\$0	4.25	6.02	9.19.08	City of Wilmington	Walking and biking trails, potential development lot	Remedial investigation and remediation partially completed	Oil refinery, mixed-scrap salvage yard, closed EPA removal site

Location & Site Description Information						Brownfield Developer Information		Environmental/Resource Information	
Site Name	Address	Funding	Acres	Census Tract	Date Certified	Name	Intended Use	Current Status	Prior Site Use
Riverside Development/ Kingswood Community Center)	2300 Bowers Street	\$86,575	6.83	30.02 (formerly 7 & 8)	11.18.10	Wilmington Housing Authority	Affordable homes and community hub with potential for education and training facilities	Remedial investigation completed; partial remediation	Residential (demolished), buffer area
12th and Brandywine Streets	12th and Brandywine Streets	\$0	0.3	30.02 (formerly 7 & 8)	6.26.06	First State Resource Conservation & Development Council, Inc.	Community Garden	Site never investigated or remediated by BDP; operating community garden	Residential
Naga Foods	909 East 14th Street	\$92,703	0.5	30.02 (formerly 7 & 8)	11.18.05	Mr. Rosario Ferrante	Roofing contractor's shop	Remedial investigation, remediation, and development complete	Forklift repair company
Habitat for Humanity	1330 Thatcher and 1303 North Heald St.	\$211,351	0.7	30.02 (formerly 7 & 8)	12.15.05	Habitat for Humanity of NCC	Affordable housing (16 townhomes)	Remedial investigation, remediation, construction completed	Foundry, manufacturing, scrap iron yard, school, repair shops
Former Diamond State Recycling	1600 Bowers Street	\$2,395	+/- 8	30.02 (formerly 7 & 8)	10.04.11	Simsmetal East LLC	Expansion of recycling operations and environmental remediation and upgrade (stormwater retention, waste separation)	Remedial investigation partially conducted but further investigation pending; old recycler remains operating	Recycling facility, railroad facility, sanitation facility
Habitat for Humanity	1000 East 12th Street	\$88,027	0.9	30.02 (formerly 7 & 8)	1.05.07	Habitat for Humanity of NCC	Affordable housing	Remedial investigation completed; remediation underway	Plumbing warehouse, Office, Auto Parts recycler/wholesaler, dairy, pet crematorium

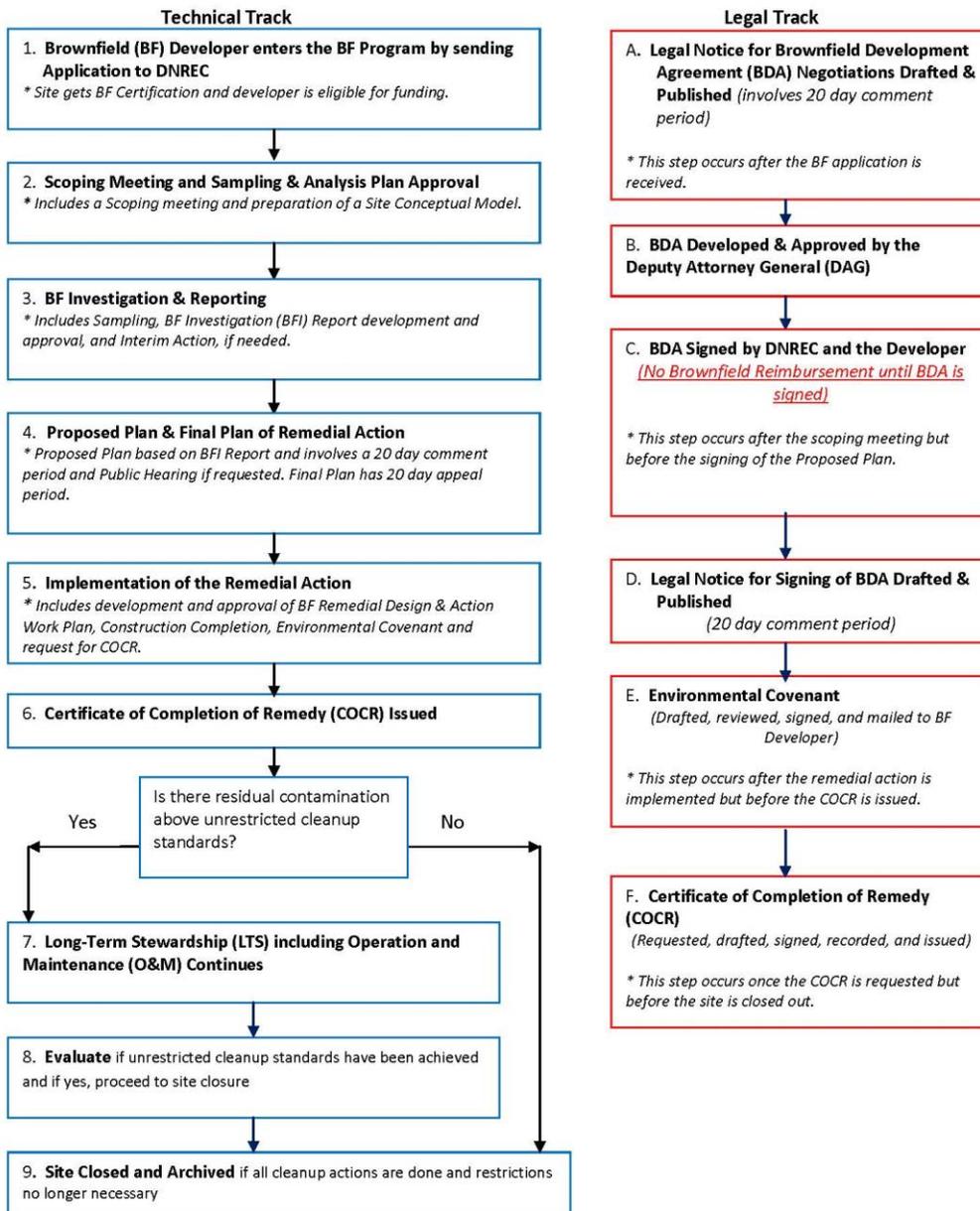
Appendix D: Delaware Brownfield Development Program Process

DNREC's Brownfield Development Program Process (Summarized Version)

(Detailed version of the Brownfield Process is available at

[http://www.awm.delaware.gov/SIRB/Documents/Flow%20Chart%20Summary 2010 10 04.pdf](http://www.awm.delaware.gov/SIRB/Documents/Flow%20Chart%20Summary%202010%2010%2004.pdf)

This summarized version should not be relied upon as a complete description of the Brownfield Process.)



Appendix E: Sample Key Informant Semi-Structured Interview Questionnaire

Introduction: *(Name of research/assessment entity)* is currently conducting a social impact assessment of the *(state/program name)* Brownfield Development Program (BDP) activities in *(study area)*. We are asking key informants across sectors to provide their perceptions of the impact of the BDP in this area. Given your experience with the program and this region, we are particularly interested in your views on these issues.

The interviewer will take notes throughout the discussion, but the interviews will not be audio- or video-recorded. Information gathered during this interview will be used to identify key themes regarding the perceived social impacts of the BDP in this area. This will provide feedback for program improvement and future brownfield development, along with other community development and planning efforts. Your responses will remain confidential. We will report on themes and recommendations that emerge as a result of all interviews conducted.

Participation in this project is voluntary. You may discontinue at any time or decline to answer any question during the course of the interview. Answers that have been provided before participation is discontinued will be included in the project's results.

Questions

1. What is your experience with the *(state/program name)* Brownfield Development Program? When did this experience begin?

[Note: If the key informant is a Brownfield Developer, please ask the following four questions, if not, please proceed to Question 2:]

- a. How many brownfields have you developed working with this BDP? Please describe these projects, including their locations, when they began, and their current status including any proposed projects that have been terminated or delayed.
 - b. What factors led you to decide to develop via the BDP?
 - c. What led you to decide to develop in this area?
 - d. Would you develop a brownfield in conjunction with the BDP in the future?
2. Are you familiar with any proposed brownfield development projects in this area, including any that have been terminated or delayed? If so, please describe. ***[If participant is unable to name individual projects in the study area, prompt by asking if they are familiar with specific brownfield development sites. If he or***

she is unfamiliar with any brownfield development in the area, discontinue the interview.]

3. Do you recall how proposed brownfield development projects were introduced to the community? Was the community engaged in the process, and, if so, how?
4. Can you describe the initial reaction to the notification of various proposals? How would you describe the responses from various stakeholders? What concerns, if any, were voiced, and by whom? Have there been any common themes to emerge in response to proposed brownfield development in general?
5. Were modifications made to initial proposals based on concerns raised? How else were concerns addressed? Was there room for debate and/or compromise to address differences among interested parties? Do you believe any interested groups were not engaged in the process? If so, please describe. Do you have any recommendations for how to better engage this group or other stakeholders?
6. Did communication between developer, BDP representatives, and community stakeholders continue throughout the course of the project(s)?
7. What impact(s) in the community did you anticipate as a result of specific proposed BDP projects?
8. Has proposed brownfield development in the area been related to other community initiatives? If so, please describe.
9. ***[If the assessment is retrospective:]*** Please describe the changes you have observed in the area since ***(baseline date)***?
10. ***[If the assessment is retrospective:]*** Do you think any of these changes are related to brownfield development? If so, please describe?
11. ***[If the assessment is retrospective:]*** What other factors (social, political, economic influences; community initiatives; etc.) do you think have impacted the area since ***(baseline date)***?
12. What is your perception of the awareness of environmental issues, including brownfields (undeveloped or in any stage of remediation or development), among community members?
13. Do you think community members believe the BDP has had an impact on any of the following areas, and, if so, what kind of impact:

Health risks

Health behaviors (such as diet, exercise, smoking, alcohol use, drug use, etc.)

Availability of health and/or social services
Crime and safety
Delinquency
Community satisfaction
Community engagement
Community aesthetics
Social networks, including family, friends, and/or acquaintances
Cultural or historical heritage or influences within the community
Belief, trust, or participation in the political system
Availability of safe and affordable housing
Property values
Economic opportunities
Commercial activity
Land use
Traffic/transportation
Environmental conditions

14. In your opinion, what are the strengths of the BDP?
15. In your opinion, what are the limitations of the BDP?
16. If you worked directly with the BDP in any way, did you encounter barriers to working effectively? If so, please describe.
17. Do you have experience with other brownfield development programs (in other regions)?
18. Based on your experiences with the *(name of the program being evaluated)*, what recommendations would you like to suggest to improve the program?
19. Do you have any recommendations of how to measure the impact of brownfield development on the general well-being and quality of life of community residents?
20. Are there any additional thoughts you would like to share on this topic?

Thank you for your valuable time and input. If you have any additional thoughts, questions, or concerns regarding this project, please contact:

(principal investigator contact information)

For questions or concerns regarding the rights of individuals who agree to participate in research, please contact:

Chair, Human Subjects Review Board

(name and contact information for research entity responsible for human subjects approval)